REACTIVATION OF THE ST. LAWRENCE FLUORSPAR MINE AT ST. LAWRENCE, NL

Project Registration

Pursuant to the *Newfoundland and Labrador Environmental Protection Act*

and

Project Description

Pursuant to the *Canadian Environmental Assessment Act*

Submitted by:

Burin Minerals Ltd.
PO Box 337
St Lawrence, NL
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Date
April 9, 2009

PREFACE

This document was prepared by BAE-Newplan Group Limited, a fully owned subsidiary of SNC-Lavalin Inc. Mount Pearl, Newfoundland and Labrador, on behalf of Burin Minerals Ltd. of St. Lawrence, NL.

Scott Wilson Roscoe Postle Associates (Scott Wilson) and Delta Minerals Limited have been engaged to complete work associated with the development of the mine and mill design and related project components. BAE-Newplan Group (SNC Lavalin) will support Scott Wilson by providing environmental and Infrastructure support including engineering and design for a new marine terminal, a tailings management system and project building infrastructure.

EXECUTIVE SUMMARY

Burin Minerals Limited (BML), (the Proponent), submits this document to both the Newfoundland and Labrador Department of Environment and Conservation (Project Registration), pursuant to the *Newfoundland and Labrador Environmental Protection Act,* and the Canadian Environmental Assessment Agency (Project Description), pursuant to the *Canadian Environmental Assessment Act*, for the Reactivation of the St. Lawrence Fluorspar Mine in the Province of Newfoundland and Labrador (the Project).

This Project is subject to both the federal and provincial environmental assessment processes. The submission of this document signifies official environmental registration with the Canadian Environmental Assessment Agency (CEAA) and the Newfoundland Labrador Department of Environment and Conservation (DOEC).

This document provides a detailed description of the Project proposed by Burin Minerals Ltd (a locally based private company). This brownfield site development Project includes four main components:

- Underground mine development of the previously mined Tarefare and Blue Beach North veins;
- Upgrades to an existing mill;
- Construction of a tailings management facility within an area historically used for this purpose; and
- Construction of a new marine terminal in the Blue Beach area, which provides the required water depths near shore (~15 m).

The St. Lawrence fluorspar mines have been reopened several times since their initial operation in the 1930s and have had several owners over the past number of decades. Burin Minerals Ltd. acquired the assets of the former Minworth operations from the government of Newfoundland and Labrador in 1994/95. BML has since carried out an extensive diamond-drilling program in 1999 and 2008 on the Blue Beach North and Tarefare fluorspar deposits in an effort to gain a better understanding of the structures.

The proposed concentrate production rates will be 120,000 to 180,000 tonnes per year. Although, this relatively small volume will only require ore carriers of approx. 10,000 to 25,000 DWT, the marine terminal is being designed so as to accommodate larger vessels (up to 65,000 dead weight tonnes in size), to allow partially loaded bulk carriers passing south of Newfoundland to come to St. Lawrence and "top-up" with fluorspar concentrate, in addition to future potential for export of by-products and allow for a multi-user port operation that might benefit the local community.

In 2002, the Town of St. Lawrence amended its Municipal Plan (Amendment Nos. 1 and 2) to support the construction of a deep-water marine terminal in the Blue Beach and Blue Beach Point areas. Amendments included:

- Rezoning, from "Conservation" to "Mineral Workings", a portion of land west of Blue Beach Point (as shown on maps provided in Appendix A);
- Re-defining the "Mineral Workings" land use designation to include "general industry and transportation". This allows for development of docks and wharfs (including deep-water marine terminals) within this zone.

As required by the Government of Newfoundland and Labrador's Urban and Rural Planning Act 2000, a prescribed public consultation process was followed in making these amendments. A public hearing was scheduled and notices were placed in the local newspaper (The Southern Gazette - January 7th and 14th, 2003 editions).

Given the above, CEAA has confirmed that a comprehensive study level EA will not be required on the basis of the marine terminal's size.

Environment Canada has also confirmed that Metal Mining Effluent Regulations (MMER) are not applicable to this project as extraction of fluorspar does not qualify as metal mining.

It should be noted that an Environmental Preview Report was previously completed for the Government of Newfoundland and Labrador in 1996, dealing solely with the use of Shoal Cove Pond for tailings management. Environmental approval was granted at that time, however it has since expired (i.e. after 3 years).

In 1997, Fisheries and Oceans Canada (DFO) authorized BML to develop a Tailings Management Facility centred on Shoal Cove Pond. This development would result in harmful alteration, disruption or destruction (HADD) of freshwater fish habitat within the watershed. Therefore, a “No-Net Loss Compensation Agreement” was completed between Burin Minerals Ltd. and DFO. DFO has confirmed that this agreement is still in effect.

Public consultations with various groups and governmental departments have recently begun as part of the EA process. Initial meetings have been held with both levels of government in an effort to coordinate, facilitate and expedite these reviews. As we continue in the public consultation process, additional meetings will be held with area residents, local fish harvesters, and additional groups with an interest in this proposed project.

The project will create direct and indirect employment in the project area. The proposed project would directly create approximately 300 jobs (at peak) during construction and approximately 178 full-time jobs during operations. The direct-to-indirect labour ratio associated with this project is estimated to be 1:3.

Site preparation will begin immediately following environmental assessment approval and receipt of all necessary permits and authorizations. Site preparation and construction is currently scheduled to begin by the spring 2010. Construction will require approximately one and a half to two years. The Proponent anticipates that the mine/mill and associated Marine Terminal will be in full operation by the fall of 2011.

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1 INTRODUCTION

Burin Minerals Limited (the Proponent) is a locally based, private company registered in Newfoundland and Labrador that proposes to reactivate the fluorspar mines and mill in St. Lawrence, NL. The St. Lawrence fluorspar deposits are among the richest in the world and are located only about 160 km from major shipping routes. Given the trend over the past few years of growing global demand for fluorspar, conditions are now favourable for reactivation of this mine.

The Project will include:

- Underground mine development of the previously mined Tarefare and Blue Beach North veins;
- Upgrades to an existing mill;
- Design and construction of a Tailings Management Facility (TMF) within an area historically used as a tailings lagoon; and
- Design and construction of a new marine terminal.

The proposed mine, mill and marine terminal will be located on a brownfield site within the town limits of St. Lawrence, on the southern tip of the Burin Peninsula, in the province of Newfoundland and Labrador.

This Project is subject to both the federal and provincial environmental assessment processes. It should be noted that an Environmental Assessment (EA) was previously completed for the Government of Newfoundland and Labrador in 1996, which focused on Shoal Cove Pond for a proposed tailings facility. As part of this provincial EA process, an Environmental Preview Report (EPR) was submitted (July 1995) and provincial approval followed at the end of the review period (January 1996), however the approval has since expired (i.e. after 3 years).

In 1997, the federal government (DFO) authorized a harmful alteration, disruption or destruction (HADD) of freshwater fish habitat associated with the proposed TMF. A “No-Net Loss Compensation Agreement” was completed between Burin Minerals Ltd. and DFO. DFO has confirmed that this agreement is still in effect.

2 GENERAL INFORMATION

2.1 PROPONENT CONTACT INFORMATION

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2.2 NATURE OF THE UNDERTAKING

Burin Minerals Limited (BML) proposes to reactivate existing underground fluorspar mines, expand an existing mill, construct a new Tailings Management Facility (TMF) within an area formerly used as a tailings lagoon, and build a new deep-water marine terminal at nearby Blue Beach for the export of fluorspar concentrate product. The mine is anticipated to produce between 120,000 and 180,000 tonnes of fluorspar concentrate per year.

An EA was previously completed by Burin Minerals in 1995-1996, consisting of an Environmental Preview Report (EPR) that focused on the proposed TMF. This was submitted to the provincial Department of Environment. Following the EA review process the project was released from further Environmental Assessment in January 1996.

The federal government also authorized a harmful alteration, disruption or destruction (HADD) of fish habitat associated with the proposed TMF, and a "No-Net Loss Compensation Agreement" was signed between Burin Minerals and the Department of Fisheries and Oceans (DFO) in 1997. DFO has confirmed that this agreement is still in effect.

2.3 RATIONALE FOR THE UNDERTAKING

The rationale for this undertaking is rooted in current market conditions for fluorspar. Global demand has increased since the early to mid 1990s, and the price of fluorspar has also seen a similar trend over this period. The current global economic crisis appears to have had little impact on the global consumption and price of fluorspar.

This Project represents a window of opportunity for reactivating the St. Lawrence mine, provided that it becomes operational by late-2011. Due to the recent downturn in the economy, the need for infrastructure projects and economic development is much needed for the St. Lawrence area. The proposed project would directly create approximately 300 jobs (at peak) during construction and approximately 178 full-time jobs during operations. The direct-to-indirect labour ratio associated with this project is estimated to be 1:3.

2.4 AUTHORIZATIONS REQUIRED / APPROVAL OF UNDERTAKING

Burin Minerals Ltd. will require authorizations from the Federal, Provincial and municipal governments for all stages of this project (construction, operations, and decommissioning). Following environmental assessment approvals, applications for specific permits will be obtained prior to start of construction. A preliminary list of required permits and authorizations is provided in Appendix A.

Burin Minerals Ltd. has identified two “triggers” which would prompt a federal EA: the *Fisheries Act*, and the *Navigable Waters Protection Act*. Burin Minerals will work closely with CEAA, the Responsible Authorities (RAs), additional Federal Authorities (FAs), and various stakeholders throughout the federal EA process.

Environment Canada has also confirmed that Metal Mining Effluent Regulations (MMER) are not applicable to this project as extraction of fluorspar does not qualify as metal mining.

Provincial legislation requires approval for activities associated with site preparation, mine development, and construction and operations. Socio-economic aspects of this project (such as potential impacts on the community, employee health and safety, and local benefits) will also be taken into consideration throughout the EA process. An historic resources impact assessment is currently underway, as required by the provincial *Historic Resources Act.*

Project components are located within the municipal limits of the Town of St. Lawrence. Municipal bylaws will be abided by throughout all stages of the project.

In 2002, the Town of St. Lawrence amended its Municipal Plan (Amendment Nos. 1 and 2) to support the construction of a deep-water marine terminal in the Blue Beach and Blue Beach Point areas. These amendments were the subject of a public consultation process several years ago. For further details on this, please see Section 8.3.

2.5 PUBLIC CONSULTATIONS

Burin Minerals Ltd. values and encourages the involvement of the local community in all stages of the Project, and considers public consultations an effective method by which to communicate with the community, businesses, regulatory bodies, and other organizations and stakeholders. Significant effort has been spent to date to provide stakeholders with information on the project, to hear their questions, and to address their concerns.

For more information regarding public consultations undertaken thus far in the environmental assessment process, please see Section 9.

2.6 SCHEDULING AND TIMELINES

The project will be undertaken in four specific stages:

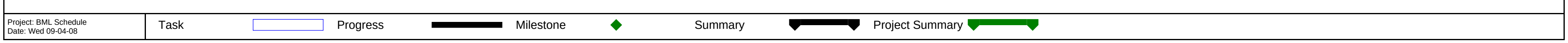
- Pre-construction (metallurgical test work, feasibility study, design and engineering, environmental assessment, etc);
- Construction;
- Operations;
- Decommissioning.

As outlined above, there are a number of differing components associated with the pre-construction phase of the project. For more information on timelines associated with each project phases, see Sections 3.4 to 3.7.

A project schedule is also provided in Figure 2-1 below.


ID
Task Name
2009
2010
2011
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
1 PROJECT SUMMARY
2 Preliminary Meetings with Gov
3 Environmental Assessment
4 Development of EA Registration
5 Govt./Public Review
6 Development of EA Documents
7 Govt./Public Review
8 EA Complete/Govt. Decision
9 Permitting
10 Feasibility Study
11 FEED
12 Detailed Design
13 Construction
14 Marine
15 Site Infrastructure
16 Mine (Tarefare)
17 Optional Mine (Blue Beach North)
18 Mill Commissioning
19 Project Start Up (Operations)

Figure 2-1


Project: BML Schedule
Date: Wed 09-04-08
Task
Progress
Milestone
Summary
Project Summary

3 DESCRIPTION OF THE UNDERTAKING

3.1 LOCATION

The proposed Project is located within the municipality of St Lawrence, Newfoundland on the southern tip of the Burin Peninsula (see Figures 3-1 and 3-2). It is approximately 350 km by road from St. John's, Newfoundland. Access is by Provincial Highway 220 to St. Lawrence, followed by one to three kms by gravel road to the Blue Beach and Tarefare Veins. The existing mill is situated near the Blue Beach North Vein, about one kilometer from the community. The topography is moderate and the site is close to St. Lawrence harbour, which is ice-free year round.

Figure 3-1: St. Lawrence, NL. Burin Minerals Ltd - Proposed Site Location

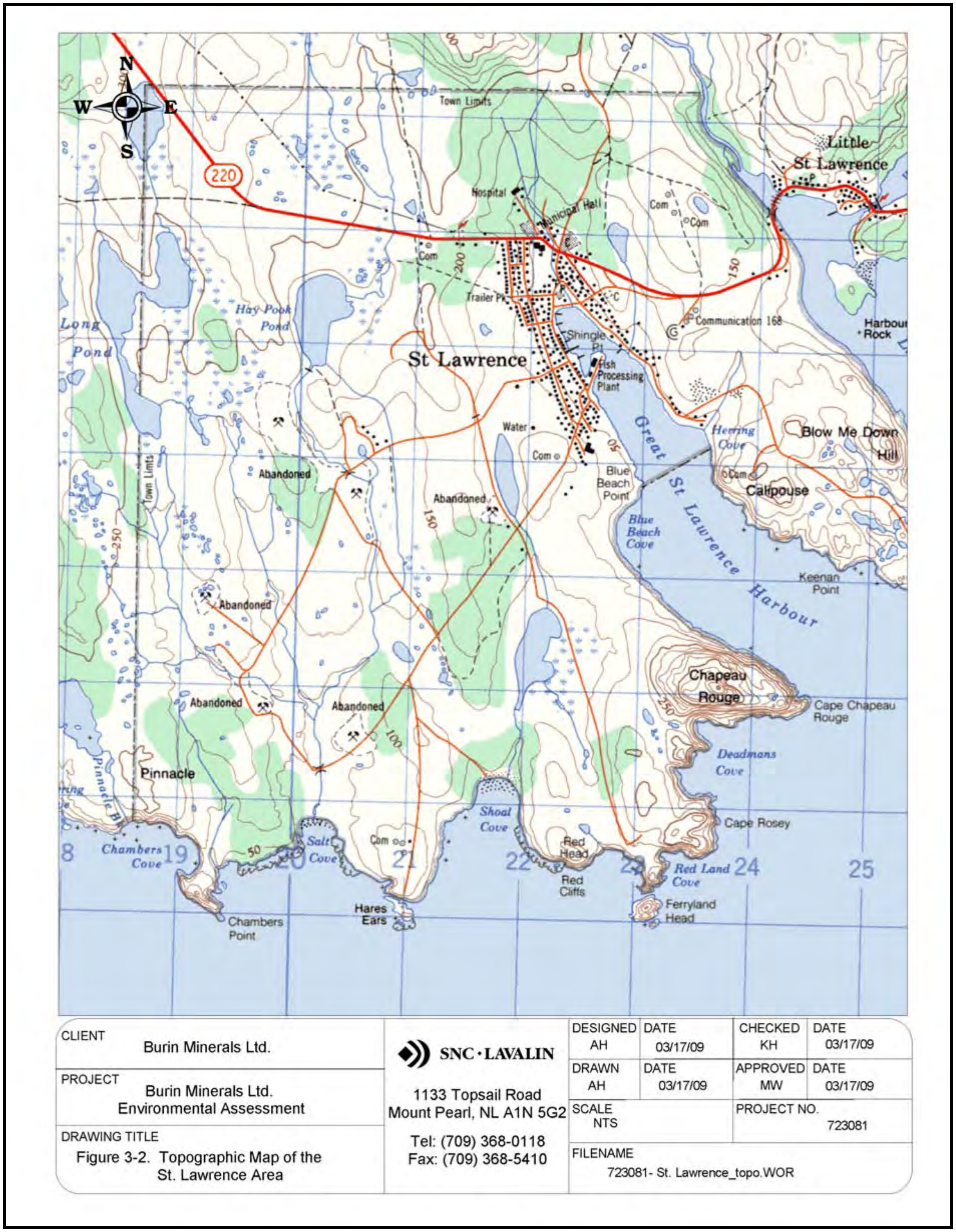


Figure 3-2: Topographic Map of the St. Lawrence Area

The coastline within the project area consists of a number of bold headlands, bordering open coves to the south of Great St. Lawrence Harbour. West-to-east, prominent natural features include Salt Cove, Hares Ears, Shoal Cove, Red Head, Ferryland Head, Deadmans Cove and Cape Chapeau Rouge. This is a rugged shoreline that is open to the sea (Burin Minerals Limited - Historic Resources Desk-Based Assessment, 2009).

As previously mentioned, the project area is a brownfield site, on which mining/milling has occurred since the 1930s. Several structures and buildings remain on site from previous operators.

Figure 3-3: Aerial Image of Project Site (original photo courtesy of DFO)

3.2 PROJECT HISTORY

3.2.1 Prior to 1957

Although a few of the area's fluorspar (CaF_2, also referred to as fluorite) veins were mined for their lead ore content in the seventeenth or eighteenth century, the first reference to fluorspar was made by Jukes who first noted a small vein (Island Rock Vein) containing "flurate of lime" in Great St. Lawrence Harbour in the early 1840's. In his geological notes of 1843 Jukes states that the quantity of mineral was "very trifling and did not promise to lead to anything more abundant".

In 1928 the Black Duck vein was rediscovered (artifacts at the bottom of an unearthed shaft proved mining had occurred prior to 1825) and in 1933 became the first producing fluorspar mine, employing about 20 men. About 2,000 tonnes of fluorspar were mined and sent to the Dominion Steel and Coal Corporation's Sydney steel plant, to be used during smelting of the iron ore from Bell Island; but the miners had to wait for their wages until the DOSCO metallurgists approved the quality of the ore as a fluxing agent.

At last, approval was forthcoming and one year later, during the summer of 1934, the Black Duck mine became the first commercial fluorspar mining venture in the area. By 1935 eight workable veins had been discovered and development of the mines became dominated by two companies, The St. Lawrence Corporation (1930) and Newfoundland Fluorspar Ltd. (1937), both eventually coming under the control of Alcan. Newfoundland Fluorspar was taken over in 1942 and "The Corporation" in 1965 and operated under the name of Alcan, Newfluor Works.

The St Lawrence Corporation was the first company to produce a flotation, or Acid Grade (AG[1]), concentrate at St. Lawrence. Tailings generated by this operation were deposited directly into the Shoal Cove Pond system via Clarke's Pond Brook from the mid-1930s until 1957 when the St. Lawrence Corporation discontinued its mining activities (see Figure 3-4).

[1] Consisting of > 97.5% fluorspar, and used primarily to manufacture hydrofluoric acid, hence the name.

Figure 3-4: Aerial Photograph of the Shoal Cove Pond Area in 1949[2]

3.2.2 1957 - 1986

After the takeover, Alcan continued to produce a Dense Media (gravel) concentrate, from Tarefare and Director Mines, which was shipped to Quebec for further processing. The St. Lawrence operations crushed, screened, and passed the raw ore through a Heavy (Dense) Media Unit to produce a minus 1 ¼" by 3/16" gravel product. All tailings were mixed back with this gravel and everything shipped to Alcan's plant in Quebec for further processing into an AG fluorspar concentrate. As a consequence, Alcan deposited no tailings into Shoal Cove Pond during its tenure in St Lawrence. Nevertheless, its plant at the Director Mine routinely discharged tailings water and mine water into Salt Cove Brook.

The Second World War increased demand for fluorspar and by 1944 some forty veins had been discovered. At its peak, between 400 and 500 people were

[2] Note that Clarke's Pond Brook, Shoal Cove Pond, Shoal Cove Pond Brook, and the beach of Shoal Cove are white in relation to nearby water bodies and bog holes. The white material is interpreted as tailings disposed of by previous operators.

employed in fluorspar mining, the only industry in the area after the destruction of the fishing grounds by the tsunami caused by the Grand Banks Earthquake of 1929.

Lower priced Mexican fluorspar and a long labour dispute forced Alcan to close its mines in February 1978 after 44 years of mining, by which time some 4.2 million tonnes of ore had been produced. Associated with the labour dispute were the health problems experienced by many miners of the area. In a 1969 royal commission report (Report of Royal Commission Respecting Radiation, Compensation & Safety at the Fluorspar Mines, St. Lawrence, Nfld) these health issues were attributed to the miners' inhalation exposure to silica dust (generated by the dry drilling methods used prior to 1945), elevated radon gas levels of the area's groundwater, and lack of suitable mine ventilation. The report indicated that wet drilling and adequate mine ventilation would have effectively mitigated these health risks. Indeed, during Alcan's operations of the 1960's and 1970's, and Minworth's operations of the 1980s, appropriate drilling methods and mine ventilation was provided and these risks were reduced to acceptable levels.

3.2.3 1986 - Onward

Production resumed in 1986 when St. Lawrence Fluorspar Limited, a subsidiary of Minworth Ltd. (UK), reopened the Blue Beach North mine and built a new processing mill and a hillside TMF at the head of Shoal Cove Pond (see Figure 3-3). The TMF included a polishing pond that discharged its effluent into Shoal Cove Pond. Unfortunately, due to initial under-funding and stiff competition from China, the company was placed into receivership in 1991. A further 440,000 tonnes of ore were mined during this period, and this generated roughly 286,000 tonnes of tailings, mostly during the company's last 32 months of operation. St. Lawrence Fluorspar Limited produced a wet, AG filter cake product, which was sold into both the North American and European markets. At the time of the company's demise, the full storage capacity of its tailings facility had been reached after only four years of use.

On Figure 3-5, Minworth's hillside TMF is visible at the centre of the frame (white area) and to the north of Shoal Cove Pond. Note that this facility was filled in only 4 years, but accounts for an area approximately ½ of the area of Shoal Cove Pond.

Old tailings deposited by St. Lawrence Corporation are noticeable at the northern part of Shoal Cove Pond where the water is shallow.

Figure 3-5: Aerial Photograph of the Shoal Cove Pond Area in 2004

3.2.4 Acquisition by Burin Minerals Ltd.

Burin Minerals Ltd. (BML) acquired Minworth's former assets from the government of Newfoundland and Labrador in 1994/95. Since then BML has carried out an extensive diamond drilling program in 1999 and 2008. This focused on the Blue Beach North and Tarefare Deposits in an effort to extend the parameters of the deposits, upgrade the previous mineral resources from *inferred* into *measured* and *indicated* resource categories suitable for compliance with various standards (such as the NI 43-101), and provide material suitable for metallurgical test work to determine a reliable and efficient processing circuit, all of which are prerequisites for producing a feasibility study for the project.

3.2.5 Historical Health Issues Associated with Work in the Mine

3.2.5.1 History of Health Issues

During the mid-1940's, people in the St. Lawrence area began to notice a high death rate in the community amongst members who worked underground in the fluorspar mines. While dust levels explained the occurrence of silicosis, it did not explain the high incidence of lung and other respiratory cancers that began to surface during the 1950's (Rennie, 2005).

Radiation surveys were completed in November 1959. The results of these surveys indicated that levels of silica and fluoride dust concentrations were normal, however levels of radon and radon decay products (radon daughters) were much in excess of permissible limits. Although new mine safety legislation and an inspection service had been established following Confederation (1949), measures to protect the health of workers were ineffective because they were simply not enforced (Rennie, 2005).

It was determined that the source of radon was the naturally occurring uranium of the region, and that groundwater was flowing through these deposits, picking up radon (i.e. radioactive daughters of uranium) as a dissolved constituent, and transporting this over some distance through bedrock fractures and into the underground mine openings of St Lawrence, where the pressurized radon gas escaped from the water into the mine air. The mine water of St Lawrence was found to have radon levels at or above those found in uranium mines themselves (Report of the Royal Commission, 1969).

3.2.5.2 Modern Protective and Mitigative Measures

The factors that contributed to the health issues of many St Lawrence's miners during the 1930s, 1940s, and 1950s have been fully understood for about 50 years. Appropriate ventilation and mitigation measures were put into place in the early 1960's by Alcan, and proper ventilation was provided in subsequent years by Alcan and Minworth (1980s). Burin Minerals will ensure proper ventilation by putting state-of-the-art mitigation measures into effect for the proposed Project. Increased awareness in both the public and private sector will help to address any remaining Health & Safety concerns and current regulations and standards will be strictly adhered to so that occupational Health & Safety risks are effectively reduced to acceptable levels.

New developments in underground drilling and blasting techniques, automated mining technologies, communication systems, computerized process control, and worker safety monitoring (gas detection and ventilation systems) will ensure that accidents are minimized and workers are not exposed to harmful substances in the atmosphere. Control systems will be properly maintained to ensure a safe work environment. Underground lighting standards will be upgraded, using recent developments in high-efficiency portable lighting sources, and BML will review and adopt available technologies to ensure all regulations are complied with.

Personal protective equipment, such as respirators, will be used in areas where airborne dust levels are high, and appropriate engineering controls will be in effect. With respect to radon, the primary emphasis will be to always maintain atmospheric concentrations in the working environment within, and generally below, permissible limits. Respirators or breathing apparatus are necessary in some, usually exceptional, circumstances such as during failure of the ventilation system or during a maintenance task for which adequate ventilation is not available.

Monitoring systems will include continuous monitors with warning lights and area/time monitoring. Efficient dust-suppression techniques will be used at each stage of the project. Workers will be instructed on how to properly operate equipment and the importance of all health and safety policies and procedures. Job rotation may be recommended for some occupations. Burin Minerals Ltd. will have specific protocols coupled with practiced emergency planning, including specially-trained mine rescue personnel, for use in the event of an emergency.

Strict industrial hygiene standards for workers will be enforced. Lunchrooms, rest rooms, and changing rooms will be isolated from working areas, and workers will be provided with convenient access to washing facilities. Washing before eating or smoking, and showering at the end of each work shift will be mandatory. Personal Protective Equipment will be used whenever required.

3.3 PROJECT COMPONENTS AND ACTIVITIES

3.3.1 Buildings and Structures

3.3.1.1 Existing Buildings and Structures

Much of the infrastructure associated with the previous mining operations, specifically at the mineshaft locations (i.e. head frames etc.), has been demolished. Similarly, electrical equipment, power lines, and other mechanical equipment have been removed.

Apart from some smaller facilities that remain, such as the old pumphouse, the majority of the existing buildings are located at the mill site. These buildings include:

- Administration building;
- Assay Laboratory;
- Warehouse;
- Mill Building;
- Concentrate Storage Building;
- Workshop; and
- Electrical Building.

All of this infrastructure will be either upgraded or replaced as part of the mine re-activation program.

3.3.1.2 Proposed Buildings and Structures

Several support buildings will be constructed on-site. All buildings will be equipped with water, power and associated Heating, Ventilating, and Air Conditioning (HVAC) installations. The main buildings to be constructed include the following:

- Administrative Office;
- Warehouse and Maintenance Building;
- Security Building;
- Mill and Crusher Buildings;
- Worker Change House (Dry) and Lunchroom; and
- Bulk Storage Building.

Additional small buildings may be required (such as pump stations, etc.); however, the need for and location of these buildings will be determined as the design progresses.

3.3.1.2.1 Administrative Office

The administrative building will be a single story structure constructed to house administrative staff. The building will include general offices, washrooms, common areas, a document control room, engineering room, lunchroom facilities, and a file storage area.

The building will be constructed of concrete foundations in combination with a timber frame structural system. Cladding will consist of metal siding and roofing.

The final dimensions of the building will be based on the project requirements determined during the design phase of the project. Approximate building dimensions are 15 m x 30 m x 4 m.

3.3.1.2.2 Warehouse and Maintenance Building

The warehouse and maintenance building will be constructed of concrete foundations in combination with a steel frame structural system. Cladding will consist of metal siding and roofing supported on a secondary structural system of girts and purlins.

The building will be sized to meet the needs of the facility including the storage of spare parts and consumables. A workshop complete with a small tool inventory will be provided.

The final dimensions of the building will be based on the project requirements determined during the design phase of the project. Approximate building dimensions are 40 m x 20 m x 8 m.

Figure 3-6: Preliminary Proposed Site Layout

3.3.1.2.3 Security Building

A small building will be constructed at the entrance of the site to house site security and provide controlled site access.

This building will be constructed of concrete foundations in combination with a timber framing structural system. Cladding will consist of metal siding.

The final dimensions of the building will be based on the project requirements determined during the design phase of the project. Estimated building dimensions are 5 m x 4 m x 3 m.

3.3.1.2.4 Mill and Crusher Buildings

A new building will be provided at the mill site to house the ore crushing operations. The building will be constructed of concrete foundations in combination with a steel frame structural system. Cladding will consist of metal siding and roofing supported on a secondary structural system of girts and purlins. The building will contain an overhead gantry crane with no less than a 10 tonne rating. The approximate dimensions of the building are 20m x 30m x 12m.

The existing mill building will be modified as required to allow for additional new equipment and will be extended to winterize an existing adjacent ore storage bin. Other expansions maybe necessary to accommodate extra flotation equipment depending on the final production capacity of the mill.

3.3.1.2.5 Worker Change House and Lunchroom

This building will house the worker facilities such as change rooms, showers and lunchrooms. It will consist of concrete foundations in combination with a timber frame structural system. Cladding will consist of metal siding and roofing.

The final dimensions of the building will be based on the project requirements determined during the design phase of the project. Estimated building dimensions are 15 m x 30 m x 4 m.

3.3.1.2.6 Bulk Storage

A bulk storage warehouse will be provided on site to store the finished filtercake product. The building will be constructed of concrete foundations in combination with a steel frame structural system. Cladding will consist of metal siding and roofing supported on a secondary structural system of girts and purlins. The building will be outfitted with conveyors and reclaim equipment to facilitate the movement of filtercake product. The approximate dimensions of the building are 160m x 30m x 22m.

3.3.2 Proposed Marine Infrastructure

3.3.2.1 Marine Facilities

Based on current project plans, the proposed marine terminal will be located in an area known as Blue Beach (46^{o} 54.0’ 11.96” N , 55^{o} 23.0’ 2.08” W). Although the main function of the wharf will be for the export of AG fluorspar concentrate (also referred to as flitercake), it will also be able to receive general cargo associated with mining operations. The port will be used in both summer and winter and thus all equipment will be suitable for cold weather operations.

The facility will be designed for an initial operating period of 25 years. National and international standards will be incorporated into the design and all applicable federal and provincial regulations will be adhered to. The core principles governing the operation of the facility will be safety, environmental protection and efficiency.

The marine facilities will consist of an approach causeway, wharf, marine and shiploading topside equipment. A working/laydown area will be incorporated into the wharf structure directly behind the berth face.

The wharf structure is likely to be constructed as an “L”-shaped (or ‘hockey-stick’) structure to take advantage of the existing water depths to accommodate the berthing of the design ship (up to 65,000 DWT vessels) without the need for dredging. The wharf will be orientated and designed to accommodate an additional side berth if this requirement is determined to be a feasible option. Specifics of the construction sequencing will be established in the design phase.

A 150 m long rock filled causeway will join the wharf with the onshore portion of the facility. The berth face of the wharf will be located approximately 250 m from the shoreline in close proximity to the 15 m depth contour. The wharf will consist of five (5) rock-filled, 19.2 m diameter, steel sheet pile cells interconnected by steel sheet pile arcs for an overall wharf length of 126.3 m. A concrete caisson option has also been considered and will be reviewed during the study. The wharf deck elevation will be +5.0 m above low normal tide (LNT). The overall seabed footprint of the causeway and wharf structure is approximately 18,000 m^2.

Since the overall vessel length is longer than the wharf, two shore-based bollards will be provided for the head and stern lines. Additional bollards will be equally spaced along the wharf face for breasting and spring lines. The wharf will be outfitted with the usual arrangement of marine hardware including fenders, ladders, lighting and power supply. Minimum water depths at the berth face will be will be 14.5 m. The wharf will be capable of handling vessels from 10,000 DWT to 65,000 DWT.

Navigation aids will be provided as per Department of Fisheries and Ocean (and Transport Canada, Canadian Coast Guard) requirements.

Additional details on alternative designs considered for the construction of the marine terminal are provided in Section 3.10.3.

Figure 3-7: Blue Beach Cove (courtesy of the Town of St. Lawrence)

Figure 3-8: Preliminary Drawing of Marine Terminal

3.3.2.2 *Onshore Facilities*

The onshore portion of the marine terminal will cover an area of approximately 1.5 ha. The facility will consist of a storage/laydown area, fluorspar storage building, access roadways and conveyor right of way.

The fluorspar storage building will be a stick-built conventional steel frame, metal clad, insulated and heated structure structure. The building will be approximately 160 m long x 30 m wide. The building will be outfitted with various material handling equipment such as a tripper conveyor, mobile equipment, reclaimer, reclaim hoppers and shiploader feed conveyors.

During the study execution the feasibility of locating the storage building at the mill site will be examined.

3.3.3 Tailings Management Area

Throughout its estimated 20-year Project life, the mines will produce an estimated total of 2.04 million tonnes of AG concentrate (at > 97.5% CaF2) and 1.5 million tonnes of high quality construction aggregate from 5.04 million tonnes of ore[3]. An estimated 2.0 million tonnes of flotation tailings would be generated during this period.

Burin Minerals proposes to construct an engineered Tailings Management Facility (TMF) within Shoal Cove Pond, a body of water whose poor quality reflects historic mining activity. During the last century[4] the St Lawrence Corporation used this pond as a lagoon for its tailings, and at one point these tailings occupied most of the pond's area (see Figure 3-4). Although it never disposed of its tailings directly into the pond, Minworth constructed a hillside TMF at the head of Shoal Cove Pond, and filled it to capacity in less than 4 years (see Figure 3-5). The effluent from this facility continues to flow directly into Shoal Cove Pond.

[3] Run-of-Mine ore averaging between 40 - 50% grade CaF_2.

[4] From the mid-1930s until 1957.

The pond's water quality has reported levels of fluoride and lead that are high (i.e. above Canadian Environmental Quality Guidelines for the Protection of Freshwater Aquatic Life, 2009), and the predominantly silty substrate may give rise to elevated levels of suspended sediment in the water column. This water flows, uncontrolled, through Shoal Cove Brook and discharges into the receiving marine environment of Shoal Cove.

A survey undertaken in the 1990s reported a high length to weight ratio for the pond's fish, suggesting that the aquatic ecosystem is currently in a stressed state relative to other freshwater bodies of the area. It is unknown to what extent the old tailings contribute to elevated concentrations of F and Pb in the pond's water, as there are outcropping veins of fluorspar with trace levels of associated sulphides within the Shoal Cove Pond watershed, and these natural sources may also be contributing to the existing background levels.

To help address these environmental issues, the proposed TMF will include a primary settling lagoon contained by an earth-filled dam located as shown on Figure 3-16 and a downstream clarification (or polishing) pond contained by a smaller earth-filled dam. Water quality monitoring/treatment stations and spillways will be included in the final design. This engineered TMF will introduce a new level of environmental control to ensure that all effluent discharging to the receiving environment is of acceptable quality.

Flotation tailings will be flocculated, possibly adjusted for pH, and deposited in the primary settling lagoon of the TMF. Supernatant from the primary pond will be decanted into the polishing pond where an additional flocculent can be added if necessary. Water will be decanted from the polishing pond and discharged to Shoal Cove Pond Brook, which leads to the ocean at Shoal Cove. A gravel road to the east of Shoal Cove Pond will be re-routed because the water level in the pond will rise and inundate the road.

In order to compensate for the loss of fish habitat in Shoal Cove Pond, BML previously entered into a freshwater fish habitat compensation agreement with the Federal government in 1997. Through recent discussions with DFO (December

2008 – March 2009), it has been determined that this previously signed agreement is still in effect, provided that there are no significant changes to the proposed undertaking. See Section 3.3.7 for further details on Freshwater (and Marine) Fish Habitat Compensation associated with this project.

3.3.4 Production Capacity

Production is expected to be between 120,000 and 180,000 tonnes per year of filtercake at between 8 and 10% moisture and at standard AG specification. This is based on 24 hours per day, 7 days per week for approximately 350 days per year.

3.3.5 Mining Methods

As mentioned before, both the Blue Beach North and Tarefare Mines have operated in the past. They are hosted by the Carboniferous St. Lawrence Granite and are steep dipping (or sub-vertical) vein type deposits varying in width from 3.4 m to 16 m, and approximately 1.5 km in length. Groundwater levels are close to ground surface and will be lowered by pumping from deep shafts.

The mining method to be employed at both operations will be a longhole open stoping with ore pillars left between stopes for support. Both veins will be mined from the bottom upward and backfilled where applicable. Backfill will consist of natural glacial till found in the general location of the mine sites as well as washed aggregate generated by the mill's Dense Media Separation circuit, and waste rock generated underground during mine development will be used where applicable. At Tarefare, the proposed production method will be holes drilled horizontally from "Alimak" raises developed in the ore. At Blue Beach North, a sublevel, blasthole method will be used, with production down-hole drilling carried out from sublevel horizontal drifts developed in ore. In each case mucking ore from the stopes will be via draw-points at the bottom of the stopes. Trackless mining using mechanized rubber-tired mucking (load/haul/dump – LHDs) equipment will be used at each operation. Figures 3-9 and 3-10 are schematics of typical underground mines that define various terms and concepts used.

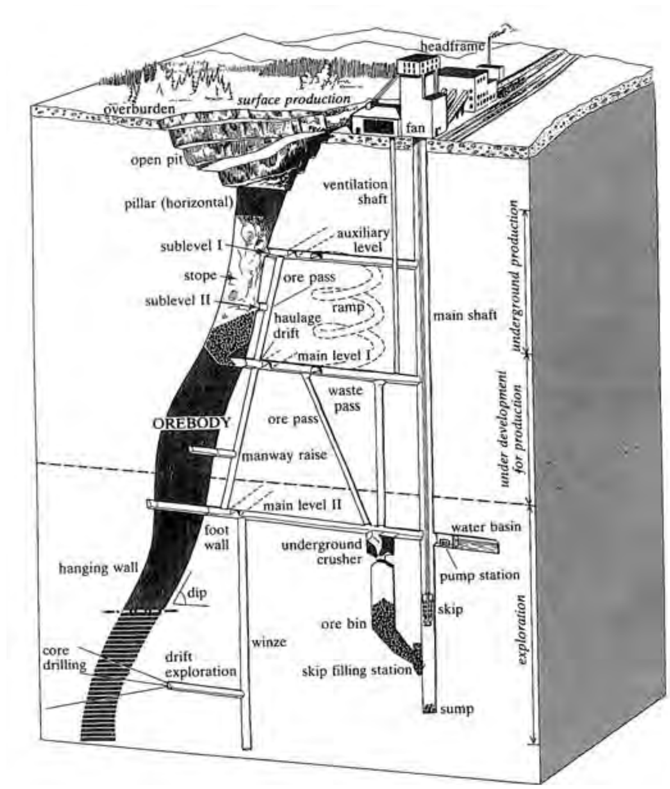


Figure 3-9: Schematic of an underground mine showing typical features

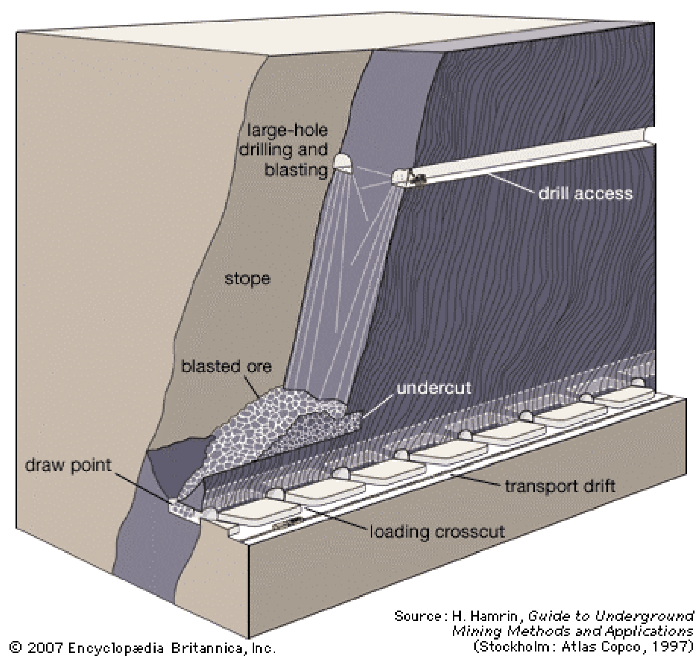


Figure 3-10: Schematic Showing Underground Mining - Likely Similar to Future Blue Beach Operations (Encyclopedia Britannica, 2007)

The Tarefare Mine will be a shaft mine operation where an existing No.2 Shaft will be equipped with a new headframe and hoist to transport ore from underground to surface. The ore will be trucked approximately 5 km on surface to the mill near Clarke's Pond. Access to the mine for people, materials and equipment will be via the shaft. An emergency second exit (and ventilation raise) will be made at the site of the former No. 1 shaft approximately one km to the south of the main shaft. Mechanized mobile mucking equipment will be dedicated to the main mine levels. A new mine-dry, garage/mechanical workshop and compressor building will be erected on the site near the headframe and hoist building. Power will be accessed from the existing substation off Highway 220 near St. Lawrence via a newly constructed pole line to the mine site. Proper ventilation will be provided by surface fans and heaters transporting air by way of the main shafts and newly-built borehole raises.

The Blue Beach North mine will use a deepened, existing ramp for access that will give total mobility throughout the mine for mechanized mobile equipment. A secondary egress point will be made via a raise to the surface. Mine development waste rock will be left underground by placing it in mined out workings wherever possible. The ore will be trucked in low profile mine trucks and/or Load-Haul-Dump (LHD) vehicles from the stope directly to the mill. The existing surface buildings (mine dry, compressor house and maintenance buildings) will be refurbished. Power is already available at the mine but will require upgrading. Surface fans and heaters utilizing existing vertical shafts and the access ramp will provide adequate ventilation.

3.3.6 Affected Area

The land portion of the Project is situated within the area zoned as Mineral Workings by the Town of St. Lawrence.

The footprint (dimensions) of all support buildings is provided in Section 3.3.1. Upon finalizing the marine terminal design, an exact footprint for this will be defined. Marine influences beyond the extent of the marine terminal footprint are not anticipated.

Potentially affected freshwater bodies include Shoal Cove Pond, Shoal Cove Pond Brook, and a portion of Clarke's Pond Brook. Metallurgical test work, which is currently in progress, will define process water requirements (in terms of quantity and quality), and this will guide the selection of an appropriate source for the mill. Currently, it is expected that mine water pumped either from Blue Beach North mine or Director Mine will be used. Further consultation with DFO will be carried out once the source has been identified.

3.3.7 Fish Habitat Compensation

3.3.7.1 Freshwater Fish Habitat Compensation

As outlined in the *Fisheries Act*, the "harmful alteration, disruption or destruction" (HADD) of fish habitat requires the development of a Fish Habitat Compensation Strategy and Plan. As indicated by DFO in December 2008, it was agreed that the Freshwater Compensation Plan developed for the 1995-1996 Burin Minerals Ltd. EA will be upheld, given there are no significant changes to project design from the 1995 EPR. Burin Minerals Ltd. is currently working with DFO to ensure the terms of this agreement are met throughout this EA.

A freshwater baseline sampling program will be undertaken during the EA period and will cover sampling sessions in 2009 (spring and summer). This sampling program will include 15 surface water-sampling locations within the Shoal Cove Pond watershed and Salt Cove Brook. Groundwater samples will also be obtained from recent geotechnical bore-hole drilling locations, as well as from accessible shafts of Blue Beach North and Tarefare. Analysis of collected samples will also provide information on the characteristics of water that may be pumped to the surface from underground. This program will ensure 'ground truthing' of previously collected data (mid-1990s) and allow for the development of a current baseline for freshwater quality.

3.3.7.2 Marine Fish Habitat Compensation

As defined above, the construction of marine facilities at Blue Beach will trigger the *Fisheries Act*. The *Fisheries Act* permits the Minister of Fisheries and Oceans to issue an authorization (under Section 35 (2)), permitting fish habitat disturbance to occur. Burin Minerals Ltd. is aware that before this authorization is given, the proponent is required to quantify the habitat, which will be affected by the undertaking.

Marine habitat will be affected only in the area of Blue Beach during the construction and operation of a deep-water marine terminal to allow for the shipment of product from St. Lawrence to world markets.

As required by the *Fisheries Act*, baseline work is currently being planned by Burin Minerals to quantify productive fish habitat, which may be affected during construction of the marine terminal. Following formal acceptance of the habitat quantification by DFO, Burin Minerals will work closely with the Department to develop an acceptable Fish Habitat Compensation Strategy and Plan.

3.4 PRE-CONSTRUCTION

During the summer of 2008, Cabo Drilling of Springdale, NL were awarded a contract to complete diamond drilling for Burin Minerals Ltd on the Tarefare (TF) and Blue Beach North (BBN) fluorspar deposits. Drilling commenced on the Tarefare deposit (with one drill) in mid-June 2008; however, lower than anticipated rates demanded the need for a second drill (which commenced drilling in late July). As a result of the delay between core extraction and the return of fluorspar sample analysis, one drill was moved back to TF while the second drill completed work on BBN; all drilling being completed by mid December 2008. In all a total of 18,368 m of drilling was conducted during the six-month period.

Work associated with the environmental assessment process began in November 2008. A kick-off meeting was held between Burin Minerals Ltd. and its environmental/infrastructure consultant, BAE-Newplan/SNC-Lavalin, in mid-November 2008.

Scott Wilson Group has been retained by BML to complete the engineering feasibility study and mine development plan. The feasibility study is scheduled to be completed by the end of August 2009.

3.5 CONSTRUCTION

3.5.1 Schedule and Work Detail

Provided all environmental approvals have been obtained, construction of the marine terminal will likely begin in the spring of 2010 and continue until late in the fall of the same year.

Construction of all required support buildings on site will begin during the summer of 2010. Buildings will be enclosed before the fall of 2010 to ensure further work (i.e.: electrical, mechanical) can continue through the fall and winter, and be completed by mid-2011.

Work to develop the mineshafts will begin immediately following environmental approval, given that approximately 24 months will be required to upgrade the Tarefare mine shaft for use during the operations phase. Blue Beach North will require approximately 17 months of work and preparation.

Construction activities on-site will be generally broken down into five components:

1. Mine development which will be on the critical path and will start as soon as possible after permits are available;

2. Mill refurbishment and upgrades;

3. Tailings Management Facility at Shoal Cove Pond and adjoining areas include construction of three earth-filled dams;

4. Construction of the new deep-water marine terminal and associated infrastructure (as described in Section 3.3.2); and

5. General site infrastructure including access roads, power lines and substations, domestic water supply, domestic sewage system, new main office building, and the following:
   - Clearing, grubbing, and levelling on the project site where necessary;
   - Construction of support buildings and on-shore laydown areas;

- Development of roads within the project area (such as between the mill site and marine terminal area); and
- Installation of temporary offices with associated services (potable water, washroom services, etc).

3.5.2 Environmental Protection Plan - Construction

An Environmental Protection Plan (EPP), which will be reviewed and approved by DOEC, will be finalized before all site preparation and construction activities begin. No blasting or dredging is planned within the marine environment. Mitigation measures will be developed to ensure minimal construction related impacts.

Silt curtains and other mitigation measures will be employed as necessary to ensure little or no impact on nearby water bodies. Burin Minerals Ltd. is familiar with DFO Fact Sheets specifying mitigation measures for construction activities such as the installation of culverts and bridge construction. Appropriate buffer zones will be respected near water bodies during site preparation and construction.

Health and Safety Plan, Emergency Response Plan (ERP), and Environmental Monitoring Plan will also be developed and approved before the start of construction. A Mine Rescue Team will be organized and properly trained in conjunction with the underground development plan.

3.5.3 Potential Causes of Resource Conflict

Potential interactions between the Project and the environment (both negative and positive) during construction may include those associated with:

- Fish and Fish Habitat (freshwater and marine);
- Resource Harvesting (fisheries, berry picking);
- Birds and Wildlife;
- Possible Species at Risk (if present in the general area of construction); and
- Socio-Economic Environment.

Potential resource conflicts may be identified as consultations continue throughout the environmental assessment process; in contrast, some listed above may be eliminated following consultations.

3.5.3.1 Terrestrial and Freshwater

As stated before, an EPP will be implemented during the Project's construction phase. This plan will help to mitigate negative effects that have the potential to negatively impact the environment.

As alluded to previously, impacts are expected on certain freshwater bodies. For example, the Project includes construction of a new TMF centred on Shoal Cove Pond. This facility will also affect the lower reaches of Clarke's Pond Brook. Accordingly, all requirements of the fish habitat compensation agreement will be respected by Burin Minerals Ltd. to ensure affected fish habitat is properly compensated.

As was indicated by participants during recent public consultations (see Section 9), the area around Shoal Cove Pond is most frequently used by walkers who follow an undeveloped road/trail to the Chapeau Rouge area. This road/trail will be rerouted to replace the existing road/trail, which will be affected by the new TMF. The Cape Chapeau Rouge walking trail beginning near the top of the existing Blue Beach South road is likely to be infringed upon by a new road to the marine facility from the mill site however suitable arrangements (bypass, overpass or underpass) will be incorporated to provide an unrestricted and safe access to the Cape trail.

Currently, various people make use of the project area. Due to concerns for public safety and recognizing that the area is designated for mining, regular access to the Project site will be limited to employees during construction and operations. This impact on users (e.g. recreational berry pickers, hunters, anglers, etc) is unavoidable. However, the terrain of the surrounding St. Lawrence region offers many alternative areas to harvest berries, etc; therefore, this restriction is not expected to cause significant concern to users of the area.

As required, surveys to assess potential impacts on wildlife, birds, and designated species at risk will be undertaken by the proponent.

The Environmental Protection Plan will also specify mitigation measures to be implemented during construction to minimize potential interactions with the environment.

3.5.3.2 Marine

During construction of the marine terminal, there may be impacts to the marine environment (fish habitat) and to the local fishery. Burin Minerals Ltd has learned that one local fish harvester has been using the Blue Beach area for lobster fishing in recent years. This likely represents a resource conflict, and BML will address this during the EA process.

As will be undertaken for freshwater fish habitat, Burin Minerals Ltd. will work closely with Fisheries and Ocean Canada to ensure that marine fish habitat is quantified and any lost habitat is properly compensated for before any construction begins.

The selected location and the design of the proposed marine infrastructures will avoid dredging or underwater rock blasting for the construction of the marine facilities.

3.6 OPERATIONS

3.6.1 Schedule and Work Detail

The proposed mine is scheduled to be fully operational by the fall of 2011. This timeframe will allow mine development and construction of all support buildings, the marine terminal, TMF, and mill.

3.6.2 Ore Processing

Depending on which mine is in operation, Tarefare or Blue Beach North, ore will be transported by truck or LHD to the mill site and stockpiled. A new crusher building will be erected to the west of the existing mill to house the crusher and screening equipment. The new crusher building will be heated and have capacity for storing approximately 1,000 tonnes of ROM (run-of-mine) ore. This arrangement reduces freezing of the ore and controls high moisture content in the feed.

The existing mill building, originally designed for a capacity of 85,000 tpa of concentrate ore, will be extended to include the existing ore bin to counteract freezing of the ore during winter. A building will house and winterize the existing thickener and a new concentrate product storage shed will be built onsite.

The processing route is likely to be crushing, screening, intermediate storage, dense media pre-concentration, grinding and froth flotation followed by concentrate thickening, filtration and storage. An intermediate product of washed gravel will be produced from the dense media separation (DMS) process. The main product will be a damp filtercake (or AG concentrate) of 97.5% calcium fluoride purity. It will be trucked or conveyed, at approximately 10% moisture content, to the new wharf storage building at Blue Beach in the outer Great St. Lawrence Harbour.

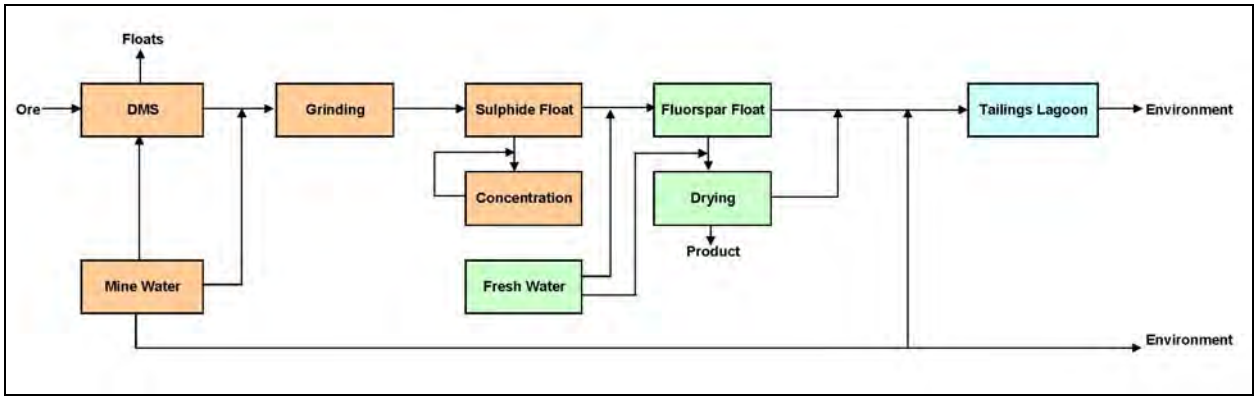


Figure 3-11: Water Balance Diagram

The following sections elaborate on the ore processing to be carried out (see the water balance and process flow diagrams shown on Figure 3-11 and 3-12). At this time, it is assumed that DMS equipment will be used to pre-concentrate the ore ahead of grinding. This represents a new system to be added to the existing mill in St Lawrence.

As mentioned previously, metallurgical testing and an engineering feasibility study are currently underway. This will clarify the quantity and quality of process water required by the proposed mill and the optimum route for discharge of mine water. Once completed an appropriate source of mill water will be identified. Currently, there are several potential options that are being evaluated. These include mine water (BBN or Director), and/or freshwater bodies within the Clarke's Pond-Shoal Cove Pond and Salt Cove Brook watersheds.

It should be noted that when Minworth operated out of BBN, mine water was discharged into Clarke's Pond, which in turn was pumped to feed the mill. This resulted in a noticeable drawdown of the pond, of about 30 cm. To date, it has not been confirmed whether or not there is a hydraulic connection between the pond and groundwater of BBN. It is also worth mentioning that water being pumped from the operating BBN mine caused fluorspar selectivity problems on the mill. This is believed due to the increase in water hardness as a result of mining.

For reasons such as this, process water requirements will be thoroughly evaluated and various stakeholders (e.g. the public, DFO, and DOEC) will be consulted before selecting a preferred mill water source.

3.6.2.1 Crushing

3.6.2.1.1 Primary jaw crusher

ROM ore will be delivered to an indoor 1,000 tonne stockpile from which blended material will be fed onto an apron feeder (or similar) by a front-end loader. This feeder will discharge, at a controlled rate, into a primary jaw crusher. Since the ore will be damp, dust suppression will not be required at this point. Surplus ROM will be stockpiled outside the crusher building.

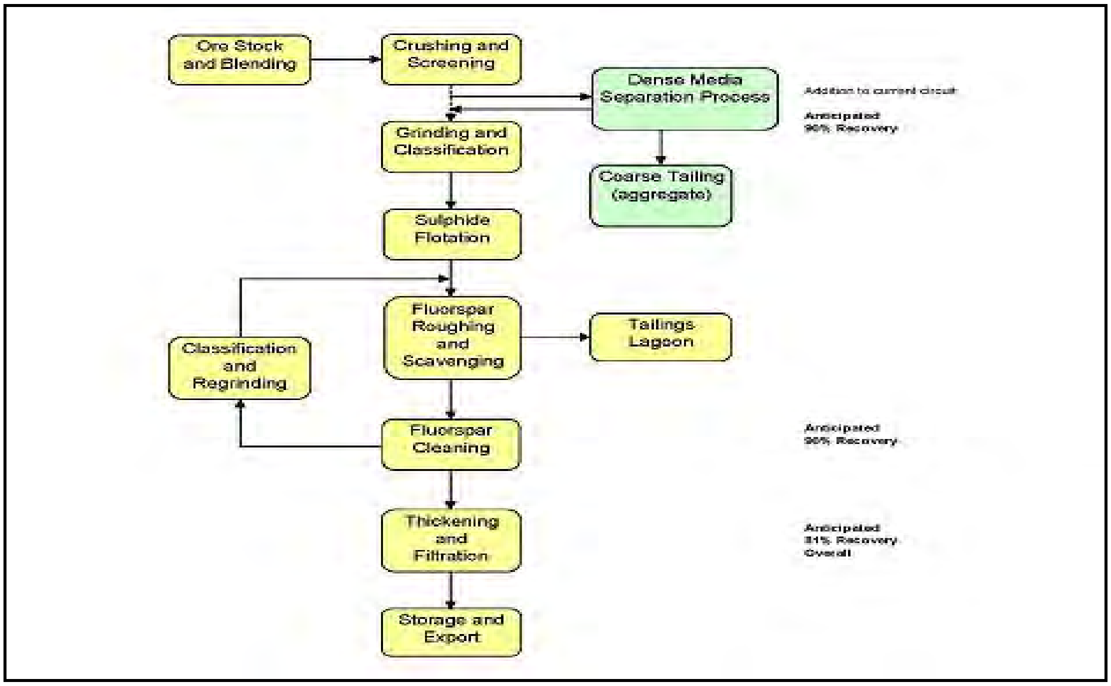


Figure 3-12: Preliminary Mill Process Flow Diagram

3.6.2.1.2 Inclined Vibrating Screen

After crushing, the ore will be conveyed to an inclined vibrating screen with two screen decks. The ore will be fed to the upper deck, which will have the coarsest openings. Material of larger size than the openings will pass down the screen while finer particles fall through to the second deck where they will be subjected to even finer screening. The ore leaving the screening equipment will have been sized into three fractions. The finest of all, which falls through the lower screen, will be conveyed to a storage bin while the coarser fractions will receive further crushing.

3.6.2.1.3 Secondary Crushers

These pieces of equipment comprise a steel cone (mantle) eccentrically driven within a steel bowl. Two types of cone crushers are likely to be used: a standard cone accepting coarse ore from the upper screen; and a short head cone, which will be fed from the surface of the lower screen. After these units have crushed the ore the resulting material will be recycled to the inclined screen for re-sizing. Dust control, including bag filtration, will likely to be required at this point and advice on appropriate equipment will be taken from crushing equipment manufacturers. Filtered fines will be passed to milling and treated air meeting regulatory requirements will be exhausted to the outside.

3.6.2.1.4 Fine Ore Storage Bin

It will be necessary to have an intermediate storage facility since crushing and screening (estimated to be operational 16 hours per day) will have a greater capacity than milling. Storage allows time for work on the high maintenance crushing section without adversely affecting the down stream processes, which work around the clock. Material from the fine ore storage bin will be passed along a conveyor and over a belt scale to the Dense Media Separation (DMS) process.

3.6.2.2 Pre-Concentration

Pre-concentration by DMS is based on the difference in specific gravity of the valuable mineral (fluorspar) and of other minerals (referred to as gangue minerals). Feed to the section will be separated into floats (or lighter than medium operating density minerals) and sinks (or heavier than operating density minerals). The floats stream will comprise a washed gravel of about 12.5 ± 0.5mm that can be used as mine backfill or sold on the market as high quality granite aggregate. It should be noted here that the previous operator, St. Lawrence Fluorspar who operated the existing 85,000 tpa mill in the 1980s, did not use a pre-concentrator circuit in their original design but planned to install such a unit prior to bankruptcy in 1990.

3.6.2.2.1 The Tri-Flo Separator

The Tri-Flo vessel consists of a fixed cylinder laying on its side, inclined at an angle of 15 degrees to the horizontal. A separating medium of fine ferro-silicon, and perhaps magnetite in water, will be pumped tangentially into the vessel through two inlets at a pressure of 15 psi, creating a rotating mass with an open vortex throughout the length of the tube. Medium leaves through the two sinks tangential outlets and the floats outlet tube. A density gradient is formed across the radius of the liquid within the tube similar to that in a hydrocyclone where the greatest density is adjacent to the vessel wall.

Prior to being fed into the separating vessel, ore from the fine ore storage bin will pass along a horizontal vibrating screen to remove all material of less than ½ mm, which would otherwise adversely affect the separating medium. The remaining raw feed (approximately 80 % of the ore) entering the upper tube inlet will be combined with a small quantity of medium. On entering the vessel, particles that are denser than the medium are pressed outwards against the wall and exits via the first sinks tangential outlet. Lower density mineral grains pass into the second chamber of the vessel where once again the heavier fraction is removed in a similar manner. Low-density material quickly enters the central open vortex where it is carried downwards, exiting via the floats outlet tube. The two combined dense sinks fractions, and the light floats fraction, on leaving the Tri-Flo will pass across horizontal vibrating screens where any adhering medium will be removed by spraying with water. Medium is constantly recycled to the system after having surplus water removed by magnetic separators.

Washed Floats, consisting essentially of gravel-size granite, quartz and calcite, will be conveyed from the building to a stockpile. As indicated before, this material will be used as mine backfill and/or sold as a washed aggregate. The remainder of the ore (i.e. the sinks fraction), having been pre-concentrated, will pass to the grinding section for further processing.

3.6.2.3 Grinding and Classification

3.6.2.3.1 Grinding (Ball Mill)

This consists of a rotating, rubber-lined cylinder containing steel grinding balls into which water and the sinks fractions from the Tri-Flo are fed. Fine grinding occurs by the tumbling action of the balls (termed media). This produces wet, sand-like slurry, which overflows from the discharge end of the mill. Grinding rate is dependant upon the energy imparted to the charge of grinding balls by the rotation of the mill; the amps drawn by the motor being a measure of the energy available to grind the ore. Slurry leaves the mill and flows through a trommel (rotating screen fixed to the end of the mill) into a discharge sump. Ore, pre-screened ahead of the DMS unit, will enter the milling circuit via this sump. Any coarse material leaving the trommel will be recycled back to the crushing section.

3.6.2.3.2 Classification (Hydrocyclone)

Slurry from the ball mill will be classified (sized) by pumping through a hydrocyclone to ensure the mineral particles are liberated. The hydrocyclone separates the slurry particles into fine and coarse fractions at a predetermined cut point by the action of centrifugal force. Slurry will be pumped under pressure into the cyclone's tangential inlet causing a rotating action. Large or heavy particles move outwards and migrate down the side of the cyclone exiting at the lower (apex) discharge point. Fine or lighter particles are less influenced and are carried upwards, leaving the unit via the upper (vortex finder) outlet.

The fine-grained hydrocyclone overflow (consisting of ~30% solids by weight in water) becomes the flotation feed whilst the coarser hydrocyclone underflow will be recycled to be re-ground along with incoming new feed.

3.6.2.4 Concentration

3.6.2.4.1 Froth Flotation

Flotation is a process whereby the surface tension of a mineral is altered so that the target mineral is generally rendered hydrophobic (by a reagent termed a collector or promoter) and the other minerals (essentially carbonate and silicate minerals in the case of fluorspar) are given a hydrophillic coating (by a depressant). In the presence of air bubbles, the target mineral will be floated (transported to the tank surface) while the other minerals will remain in the liquid phase.

The resulting mineral-rich froth can then be skimmed from the surface of the tank (termed a cell) in which flotation has taken place. Some gangue (unwanted minerals) will have been collected along with the target mineral so the froth is subjected to several stages of cleaning where, by washing with water (sometimes in the presence of additional reagents), increasingly pure concentrate results.

In the fluorspar cleaning circuit, any depressed or locked fluorspar particles remaining in the slurry (termed a middling) flow by counter-current back through the cell circuit to the regrind mill. This ball mill further liberates minerals, which are then returned to the flotation circuit for upgrading. Slurry (tailings) consisting primarily of carbonate and silicate gangue minerals, but which exclude recovered sulphides (see below), will be pumped to the TMF for disposal.

Associated with fluorspar are minor amounts of naturally occurring sulphide minerals. These must be removed before producing a high quality AG fluorspar concentrate. Galena (PbS) and sphalerite ((Zn,Fe)S), and to a lesser extent pyrite (FeS2) and chalcopyrite (CuFeS2), commonly account for less than 1% of the area's vein minerals (DME, 1983). While some of these sulphides have market potential they would nevertheless be considered "impurities" if found in the final fluorspar concentrate. Therefore, these will be selectively removed as a first step in the flotation circuit. After initial flotation, the sulphide-enriched material will pass to a yet undetermined gravity separation process to further concentrate the sulphides.

This sulphide-rich material will be stored in drums for shipment off site, in contrast with the historical practice of mixing it with tailings for on-site disposal. Water from the process will be recycled back to the circuit.

The actual reagents to be used in the flotation process will be determined by metallurgical test work. However, Table 3-1 below provides a list of likely reagents that would be used and the reason for their addition. Very preliminary estimates of annual consumption are also given.

3.6.2.5 Dewatering

3.6.2.5.1 Thickening

Concentrate which leaves the final fluorspar cleaner cell does so accompanied by water which may be as much as 75% of the total volume. To further concentrate the solids, the pulp will be pumped to a large diameter holding tank called a thickener. Due to the large volume of the tank compared to the small stream of pulp entering it, quiescent settling is gained. Solids fall to the tank bottom where they are transported to a lower central outlet by slowly revolving rakes. The clarified water meanwhile overflows a lip at the surface and is discharged to the tailings pump box and so to the TMF. The solids content of the pulp raked to the center of the thickener has now increased from about 25% to 65% solids by weight and is pumped to a filter.

3.6.2.5.2 Filtration

Further water removal is needed to render a transportable and saleable product. This is accomplished by vacuum filtration. The equipment consists of a hollow drum, covered by a fine cloth, slowly rotating in a bath of constantly agitated pulp. Panels under the cloth are evacuated causing pulp to be sucked onto the surface where the solids remain while water is drawn through. This water is passed to the tailings pump box. As the panels rise from the bath the attached solids, still under vacuum, begin to dry. Eventually the panels return to the bath but just prior to doing so the vacuum is replaced by compression. This causes the solid cake to become detached and fall over a knife-edge into a transfer chute from which it is conveyed over a belt scale, to stock at about 10% moisture.

Table 3.1: Preliminary Estimate of Reagent Usage

Reagent	Container	Reagent Consumption		Country of Origin	Probable Quantity in Storage (tonnes)	Comments
		$kg_{reagent}$ per $tonne_{ore}$	tonne per year			
Ferro-Silicon	powder in drums	0.50	188	South Africa	20	Only used if metallurgical testwork confirms that DMS is applicable. This may be replaced with less expensive magnetite (Fe_3O_4) if applicable (i.e. testwork dependant).
Bentonite (clay)	powder paper sacks	0.01	4	USA	1	Only used if metallurgical testwork confirms that DMS is applicable.
Soda Ash	bulk powder?	1.80	675	Canada	20	This is often used in grinding to prevent erosion/corrosion of media by raising the pH of the system. It is also used in fluorspar flotation to aid in saponification.
Xanthate	powder in drums	0.02	8	USA	4	Used as a collector for sulphides ahead of fluorspar flotation.
Frother (e.g. methyl isobutyl alcohol)	liquid in steel drums	0.03	11	USA	5	Used as a frother to stablize bubble formation in sulphide flotation.
Sodium Silicate	liquid in steel drums	1.80	675	USA	10	Used as a dispersant and iron-stained quartz dispersant. (Unsure if this will be used at all. The need for this will be defined by the metallurgical testwork.)
Quebracho (e.g. polyphenolic polymers and carbohydrates	powder in paper sacks	0.10	38	Argentina	20	Used as a carbonate mineral (e.g. calcite ($CaCO_3$), dolomite ($CaMg(CO_3)_2$), etc) depressant. This is an organic material of vegetable origin.
Dextrine (or starch)	powder in paper sacks	0.70	263	Canada	10	Used as a depressant for barite ($BaSO_4$) and some carbonate minerals.
Oleic acid	bulk liquid?	0.35	131	Canada	20	Used as a collector for fluorspar.
Emulsifier	liquid in plastic drums	0.03	11	UK	5	Used to aid in emulsification of oleic acid in winter.
Sulphuric Acid	liquid in plastic drums	1.60	600	Canada	10	Only used if pH adjustment of tailings is required, as determined by metallurgical testwork. To be used ahead ahead of flocculant addition.
Poly-electrolyte Flocculant	powder in plastic sacks	0.04	15	USA	2	Used to promote settling of tailings in the storage facility. May also be added, when needed, to supernatant to promote further settling in the polishing pond.
Defoaming Agent	liquid in steel drums	0.03	11	USA	5	Added to the sulphide concentrate launder (to alter the mineral surface tension properties) ahead of any gravity concentration process. A typical reagent would be Texofor D4 hydrophilic anti-foaming surfactant.

3.6.3 Shipping

3.6.3.1 Anticipated Shipping Activity

The AG fluorspar concentrate production from the proposed operation is relatively small (at 120,000 to 180,000 t/yr). Vessels in the range of 10,000 – 20,000 DWT could easily accommodate this, however BML proposes to construct the wharf to accommodate larger vessels (up to 65,000 DWT in size) to allow partially-loaded bulk carriers to “top up” with fluorspar concentrate. The proposed marine terminal will be situated at Blue Beach, in outer St Lawrence Harbour, as shown on Figure 3-7.

Approximately 18-20 shipments of fluorspar are anticipated per year from this marine facility from Burin Minerals. In addition washed aggregate, a by-product from the fluorspar milling process, may also be shipped from time to time. It should also be noted that neither fluorspar nor aggregate shipping falls under the *Shipping of Dangerous Goods Act.*

The proposed deep-water wharf consists of an armour stone, rock-filled causeway, which would likely terminate at rock-filled steel sheet pile cells interconnected by steel sheet pile arcs for an overall wharf length of 126.3 m. or rock-filled concrete caissons, as described in previous sections.

An intermediate concentrate storage building may be erected adjacent to the wharf. During times of loading, concentrate will be conveyed from this building along the wharf to a ship loader comprising a gantry tower (on rails) with a retractable conveyor. Alternatively, concentrate may be conveyed directly from the mill storage building to the gantry tower. A lay-down area will be constructed adjacent to the wharf causeway for by-product storage. Figure 3-8 indicates the current concept being considered for this marine terminal, which will be a multi-user facility available to other businesses in the region.

3.6.3.2 Aquatic Invasive Species

Alien invasive species are often introduced to an area by way of the transport of ballast water from one body of water to another, or by attaching to the hulls of marine vessels. In recent years, several such species have been introduced to the waters of other Atlantic provinces. The possibility of introduction of alien species to Placentia Bay is currently a concern.

Ballast is defined by Transport Canada as "any solid or liquid brought on board a vessel to increase the draft, change the trim, regulate the stability or to maintain stress loads within acceptable limits" (TC, 2007). With advances in technology, water has become the ballast of choice. Water is pumped into ballast tanks within the hull of the vessel and is later released once the ballast is no longer needed.

This system poses some level of risk, as aquatic species can make their way into the tanks of the vessel during the process of taking on water for ballast. These aquatic species may include bacteria, microbes, micro-algae, etc. The emptying of untreated ballast water at a later time may lead to the introduction of these species to areas in which they are not native. If the introduction of non-native species to an area has serious impacts on the ecosystem, environment, economy, and human health of the area, they are considered to be *invasive species*.

Invasive species have been known to cause negative and irreversible changes to local biodiversity and disrupt ecosystem balance. This can also have economic implications: millions of dollars have been spent in areas such as the Great Lakes and the province of Prince Edward Island in attempts to control the spread of invasive species.

Due to these risks, the Canadian government has implemented *Ballast Water Control and Management Regulations* to govern the exchange of ballast water by vessels in Canadian waters (TC, 2007). These regulations, which came into effect in December 2006, control the conditions under which the release of ballast water is permitted, as well as protocols that must be followed throughout the process.

There are several methods currently available to prevent the introduction of aquatic species to non-native ports, however mid-ocean exchange of ballast water appears to be the most accessible and cost effective method currently available.

Burin Minerals Ltd. will institute measures to ensure vessels making use of the marine terminal practise proper ballast water management. These measures will support and comply with the *Canadian Ballast Water Control and Management Regulations* that govern the protection of waters under Canadian jurisdiction from non-indigenous aquatic organisms.

3.6.4 Site Utilities, Infrastructure and Support Systems

3.6.4.1 Site Water Supply

Potable water supply for the facility will be obtained from the domestic supply of the Town of St. Lawrence, via a pipeline connecting directly into the Town system. All approvals will be obtained from the town, however based on past operations the domestic consumption quantities are within the town's capacity. A potable water storage tank will be constructed on site to maintain adequate water supplies during periods of low capacity (e.g. during peak fish plant operations when availability is reduced).

3.6.4.2 Fire Protection Water

Water required for fire protection will be obtained from a separate supply. It will be pumped directly from a dedicated intake at nearby ponds or from the mine.

3.6.4.3 Domestic Wastewater

The domestic wastewater generated at the site will be accommodated using a septic system/tile field or a self-contained treatment unit.

3.6.4.4 Electrical Supply

Electrical power for the mill/mine facility will be supplied from the local utility power grid system. Transmission lines will follow existing utility corridors.

3.6.4.5 Site Drainage

To minimize the environmental impacts and risks of slope instability, all drainage from the site will be intercepted by rock-lined ditching and channelled beyond the site limits to the ocean. Natural drainage that runs through the area will be directed into ditches and culverts and directed off site. The entire site will be graded to direct stormwater and snowmelt from the site constructs through a series of perimeter ditches and culverts.

3.6.5 Potential Causes of Resource Conflict

Potential causes of resource conflicts during operations will be very similar to those listed for construction in Section 3.5.3. Specifically, during operations there are possibilities for interactions to occur with respect to:

- Fish and Fish Habitat (freshwater and marine);
- Resource Harvesting (fisheries, berry picking);
- Birds and Wildlife;
- Possible Species at Risk (if present in the general area of construction);
- Water Quality; and
- Socio-Economic Environment.

3.6.5.1 Terrestrial and Freshwater

As identified in Section 3.5.3, there will be impacts to some freshwater bodies within the project site. All freshwater fish habitat impacted by project activities will be compensated for as required by the *Fisheries Act*.

As also identified 3.5.3, there will be some level of impact on recreational users of this area. Berry pickers, walkers, and hunters will be unable to gain access to the project site for safety purposes.

As water levels in the TMF rise (due to rising tailings levels), the current unpaved road around Shoal Cove Pond will be submerged. Burin Minerals Ltd. has indicated that it will reroute/construct a road to ensure walkers and recreational users have continuous access to the Cape Chapeau Rouge/Rosey Ridge area.

3.6.5.2 Marine

Shipping associated with Project operations is not anticipated to result in significant impacts to the area (e.g., fluorspar export would require less than fifteen (15) ships per year of size 10,000 DWT). All marine fish habitat impacted by Project activities will be evaluated and, if necessary, compensated for in accordance with the requirement of the *Fisheries Act*.

The potential impact of the project on the present fishing activities at the proposed marine terminal will be assessed and appropriate mitigation measures will be implemented. The Proponent has already begun public consultations with fish harvesters in the area and will ensure that the project will not have any significant impact on the fishing activities in the area.

3.7 DECOMMISSIONING

The fluorspar mines and mill is expected to remain open for a minimum of 20 years. Following conclusion of the usefulness of the mine/mill, the decommissioning and closure phase will begin. The objective of this project phase will be to reduce and remediate environmental impacts resulting from project infrastructure and activities.

A comprehensive Rehabilitation and Closure Plan will be developed for the project site. This plan will ensure the protection of employees and community health; it will also help reduce any potential long-term negative impacts on the local environment. This plan will be developed and submitted to appropriate government agencies for approval, as required. Consultations with these agencies will be carried out during development of the plan.

Site rehabilitation will begin with the removal of machinery and structures related to mine/mill operations. Re-usable equipment and machinery will be transported to other locations. Many aboveground installations will be removed. Exposed soil areas will be re-vegetated with appropriate seed material as required.

Upon abandonment, the site will either be rehabilitated to a semi-natural state, or used for an alternate industrial or commercial development.

3.8 HUMAN RESOURCES / OCCUPATIONAL INFORMATION

Burin Minerals Ltd. is committed to maximizing local benefits and hiring locally or provincially as much as possible. Initial discussions have been held with groups, such as the Schooner Regional Economic Development Board and the Town of St. Lawrence, emphasizing the need for labour market analysis.

3.8.1 Estimated Occupational Requirements for Design & Construction

The estimates below reflect anticipated direct hiring by Burin Minerals Ltd for the design and construction phases of the project. The proposed project would directly create approximately 300 jobs (at peak) during construction. It is reasonable to assume that a large number of people in the project area will also benefit from indirect employment.

Table 3.2: Estimated Occupational Requirements for the Design Stage of the Project

Occupation	# of Personnel	NOC Code
Engineering Managers	4	0211
Process Engineers	3	2134
Mechanical Engineers	3	2132
Civil/Structural Engineers	4	2131
Geological Engineers	2	2144
Mining Engineer	2	2143
Electrical Engineers	3	2133
Metallurgical Engineers	2	2142
Loss Prevention, Safety Engineer	1	2148
Designer (Drawing Office)	14	2252
CAD Operator	12	2253
Buyer (procurement)	1	0113
Document Controller	1	1413
Secretary	2	1241
Mechanical Engineering Technologist	6	2232
Electrical Engineering Technologist	4	2241
Civil Engineering Technologists	4	2231
HSEQ	1	2263
Project Management	2	0711
Project Controls	2	2131
Administration	2	1221
Architects	1	2151
Land Surveyors	2	2154
Land Survey Technologists	2	2254
Construction Estimators	1	2234
Total	**81**	**-**

Table 3.3: Estimated Occupational Requirements for the Construction Stage of the Project

Occupation	# of Personnel	NOC Code
Pipefitter	6	7252
Millwright	8	7311
Sheet Metal Workers	8	7261
Construction Management	6	0711
Scheduler	1	1473
Construction Trades Helpers and Labourer	30	7611
Electrician	4	7242
Equipment Operators	24	7421
Pipe Welder	6	7265
Roofers	4	7291
Insulator	2	7293
Painter (Industrial)	4	9496
Carpenter	12	7271
Surveyors	2	2154
Plumbers	4	7251
Ironworker	12	7264
Welder- Structural	6	7265
Concrete Finisher	4	7282
Drywall Installers	4	7284
Heavy Duty Equipment Mechanics	6	7312
Crane Operators	4	7371
Drillers & Blasters	6	7372
Commercial Divers	4	7382
Truck Drivers	12	7411
Electrical Power Line and Cable Workers	4	7244
Telecommunications Line and Cable Workers	4	7245
Other Trades and Related Occupations	12	7383
Construction Inspectors	4	2264
Engineering Inspectors	4	2262
Construction Supervisors – Electrical	2	7212
Construction Supervisors – Pipefitters	2	7213
Construction Supervisors – Metal Workers	2	7214
Construction Supervisors – Carpentry	2	7215
Construction Supervisors – Mechanic	2	7216
Construction Supervisors – Heavy Construction	2	7217
Construction Supervisors – Other Trades	4	7219
Mining Personnel (Year 2010)	21	8231/8411
Mining Personnel (Year 2011)	125	8231/8411
Total	**369**	**-**

3.8.2 Estimated Occupational Requirements for Operations

The estimates below reflect anticipated direct hiring by Burin Minerals Ltd for the operations stage of the project. It is estimated that approximately 178 full-time jobs will be created in the community during operations. The direct-to-indirect labour ratio associated with this project is estimated to be 1:3.

Table 3.4: Estimated Occupational Requirements for the Operations Phase of the Project

	Type of Occupation	Number Of Employees	NOC Code
Mill Workforce	Supervisor - Staff	4	9211
	DMS Operator	4	9411
	Grinding Operator	4	9411
	Flotation/Dewatering Operator	4	9411
	Laboratory Technician	5	2212
	Electrician/Fitter	4	7242
	Crushing Operator	4	9411
	Loader Operator	4	7421
	Reagent Operator	2	9411
	Laboratory Supervisor	1	2212
	Metallurgical Trainee	1	2212
	Laboratory Trainee	1	2212
	Maintenance Foreperson	1	0721
	Electrical Foreperson	1	7242
	Maintenance Fitter	2	0721
	Electrician	1	7242
	Lubrication / Forklift driver	1	7421
	TOTAL MILL	**44**	**-**
Mine Workforce	Captain	1	8221
	Shifter/supervisor	4	8221
	Safety/Trainer	1	2263
	Surveyor	1	2212
	Geologist	1	2113
	Mine Technician	1	2212
	Maintenance General Foreperson	1	0721
	Engineer	1	2143/2113
	Mine Clerk	1	1473
	Storeman/woman	1	1472
	Dryman/woman	2	8411

	Type of Occupation	Number Of Employees	NOC Code
Mine Workforce (Continued)	Security	2	6651
	Leader	4	8231
	Miner 1	16	8231
	Hoistman/woman	4	7312
	Support 1	4	8411
	LHD Operator	12	8231
	Truck Operator 2	16	8231
	Miner 2	4	8231
	Pump/Crusher Operator	20	8231
	Mechanic Journeypersons	8	7312
	Mechanic 1	10	7312
	Electrical Journeypersons	4	7242
	TOTAL MINE	**125**	**-**
Administration	General Manger	1	0811
	Mine Superintendent	1	8221
	Mill Superintendent	1	8221
	Comptroller	1	0111
	Receptionist/Clerk	1	1411 / 1414
	Accounts Payable	1	1431
	Accounts Receivable/other	1	1431
	Purchase/other	1	1225
	General Accountant	1	1111
	TOTAL ADMINISTRATION	**9**	**-**
	GRAND TOTAL	**178**	**-**

3.8.3 Employment Equity

BML is committed to creating a diverse workforce. Employment equity measures will be implemented for all phases of the project to ensure the employment of groups traditionally under-represented in the mining sector (women in particular). Burin Minerals Ltd. recognizes the shortage of opportunities made available to women in the past to ensure their introduction into the mining sector and will support initiatives to increase the employment of under-represented groups during all phases of this project.

3.9 EMISSIONS, DISCHARGES AND WASTE

3.9.1 Tailings Management

The process will produce both a coarse 'float' from the DMS pre-concentrator and fine-grained tailings from flotation. There may be an opportunity to sell the coarse float material (washed aggregate) as decorative gravel or building material dependent on certain aggregate standards being met. Alternative uses for this material could be as a surface aggregate in road building or as underground mine backfill.

Fine mill tailings (primarily ground granite and carbonate minerals) will be deposited in the proposed TMF. Prior to deposition, the pH may have to be adjusted and a flocculent may be required; however, the need for and design of such treatment will be defined by metallurgical test work that will soon be carried out, as well as monitoring at the mill during operations. These amendments to the tailings stream will be made at the mill before discharge to the TMF. The flocculants (settling aids) cause the mineral particles to bind together to form larger clusters. These settle more rapidly and are less likely to become re-suspended by waves and currents. The decant water (or supernatant) leaving the settling pond at the dam spillway will be monitored and may be further treated with flocculants before passing to the clarification, or polishing, pond where final settling will take place. Monitoring of this pond will be carried out to ensure its water quality meets with all regulatory requirements before discharge to the receiving environment of Shoal Cove Pond Brook.

Alternatives considered for the design of the TMF are described in detail in Section 3.10.

3.9.2 Atmospheric Emissions

3.9.2.1 Construction and Operation

Considering that the Project's main source of power during operations will be electrical and supplied via the provincial grid, there will be no air emissions associated with generating power at the site, with the possible exception of those produced by backup emergency generators. The primary sources of air emissions during operations will therefore be as follows:

- Diesel exhaust from various equipment used underground and/or on the roads (haul trucks, loaders, etc);
- Road dust caused by moving vehicles over gravel roads;
- Dust generated by handling, conveying, storing, and loading AG concentrate between the mill and ship loading facilities;
- Mine ventilation system exhaust from underground openings (dust, diesel fumes, radon gas, stale mine air, etc.); and
- Various exhaust ports from the mill's crushing and processing equipment (dust, stale building air, etc.).

During the construction and mine development phase, air emissions will be mainly from diesel powered equipment and dust generated during site preparation and building construction.

All potential sources of air emissions will be controlled through various means (e.g. engineered systems, operational and maintenance activities, and industry best practices that will form part of the Project's environmental management system) to ensure that all regulatory requirements are met. Mitigation measures will be identified during various design phases and noted in the Project's Environmental Protection Plan, which will be developed for construction and operation. These measures may include such things as:

- Application of water or water-based dust suppressants on gravel roads;
- Use of manufacturer-recommended dust control equipment for the crushing plant;
- Closed-conveyor systems used to deliver crushed ore from the crusher building to the mill storage bin, concentrate from the mill to the storage building, and from the storage building to the shiploader and the ship. Where trucks are used to transport concentrate instead of conveyors covers will be on the trucks.
- Proper building ventilation systems, complete with appropriate filters to reduce exhaust emissions; and

- Indoor storage of fine AG concentrate to reduce dust dispersion by winds.

3.9.2.2 <u>Greenhouse Gases (GHG)</u>

With growing concern over climate change, Burin Minerals is committed to reducing its GHG footprint. Conceptual design of various Project components (mill, infrastructure, TMF, marine terminal, etc) is presently underway, and opportunities to reduce this footprint are being explored. Some of these include the following:

- Use of mine water for milling processes. Mine water would not have to be heated to the same extent as freshwater during winter months, thus reducing energy consumption and GHG emissions;

- A TMF centred on Shoal Cove Pond. This represents a natural topographic depression and would likely occupy far less area than a series of hillside storage areas (see section 3.10). This alternative would leave more natural vegetation to function as a "carbon sink"; and

- Designing/constructing a marine terminal to handle 65,000 DWT vessels. Large ocean-going vessels that travel between North America and other parts of the globe typically carry ballast. A terminal such as is proposed by BML would allow large ships to stop and replace some of their ballast with AG fluorspar concentrate, and thus increase their payload. This would reduce fuel consumption/GHG emissions associated with transporting the product to buyers, as the alternative of hiring dedicated, smaller ships would add appreciably to the cost of BML's product and generate far more greenhouse gases per tonne of product delivered.

3.9.3 Aquatic Discharges

Wastewater from the mill will consist of water extracted from the thickening and filtration circuits while dewatering the material exiting the final fluorspar cleaner cell.

This wastewater will be mixed at the mill with tailings[5], which will be directed to the TMF.

Prior to discharge to the TMF, the tailings/wastewater will be pH adjusted and amended with a flocculent. This will promote settling of fine-grained tails in the primary settling lagoon of the TMF. As described in Section 3.10, two dams will be built initially within Shoal Cove Pond to separate the primary settling lagoon (Cell 1) from the polishing pond (Cell 2). When Cell 1 becomes filled after several years, the containment dam of Cell 2 will be raised and a third dam will be constructed to provide a new polishing pond. During the Project's entire operation effluent released to the environment will be monitored to ensure current regulations are being met.

Analysis and metallurgical testing is being completed throughout the environmental assessment process. This will identify the milling processes and help define more clearly the quality of tailings to be managed during the Project's lifespan. This test work will also define the type and quantity of various reagents that will be required for milling. Table 3.1 provides a tentative list of reagents that will possibly be used during processing.

Water pumped from the mine will be used for process with the remainder discharged to the tailings pond or local streams.

Strict monitoring measures will be taken to ensure all effluent discharged to the receiving environment meets the requirements of all federal and provincial regulations.

3.9.4 Waste Disposal

Burin Minerals is committed to ensuring all waste will be handled properly through all Project phases. Efforts will be made to promote waste minimization and waste segregation.

[5] Tailings are defined as the materials left over after the process of separating the valuable fraction from the worthless fraction of an ore. The tailings of St Lawrence will consist primarily of silt size particles of granitic and carbonate minerals. Trace levels of sulphide minerals that are naturally associated with the fluorspar will be recovered during the initial floatation circuit, if possible, so that the produced tailings should have lower concentrations of these than the tailings of previous operations.

As described above, liquid wastes will be treated to acceptable levels prior to discharge to the environment. Only qualified contractors will be engaged for hauling and disposing of wastes. This includes all wastes, if any, that may be classified as hazardous. As required by the provincial government, waste management plans will be developed for different project phases (to reflect the changes in waste associated with varying activities in each project phase).

There are currently ten waste disposal facilities on the Burin Peninsula:

- Epworth – Great Salmonier
- Fox Cove – Mortier
- Frenchman's Cove
- Garnish
- Lamaline
- Lawn
- Lord's Cove
- Point May
- St. Lawrence
- Winterland

Burin Minerals Ltd. is aware of Provincial plans to develop Regional Waste Management Strategies and will ensure company policies support efforts to advance regional waste management initiatives.

All sanitary wastewater generated at the site will be accommodated using a septic system/tile field or a self-contained treatment unit, designed and constructed in accordance with Provincial government requirements.

3.10 PROJECT ALTERNATIVES

3.10.1 General

Environmental Assessments require that various "alternatives" be taken into account. Two fundamental alternatives to be considered are whether or not the project is to proceed. When it has been established that the Project should proceed, then subordinate (or within-project) alternatives are evaluated, such as project locations, components, methods, etc. These are briefly described in later subsections.

The conclusion to not proceed may yet be reached by BML on completing its feasibility study, which will be finalized later this year (Summer/Fall 2009). It may also be the decision reached by the provincial and/or federal governments, based on results of the federal and provincial EA processes. Decisions effecting Project viability will be based on a number of factors, including economic and technical feasibility, and predicted biophysical and socioeconomic effects. Note that a decision to not proceed will result in no changes (positive and negative) to the environment.

As stated before, the area has been negatively impacted by past mining activity. A "no go" decision will therefore mean that opportunities for BML to install appropriate environmental controls at Shoal Cove Pond will be lost; that economic benefits to the community, region, province, and country during the Project's lifespan will not be realized; and that construction of a multi-user marine terminal by BML in St Lawrence will not take place.

3.10.2 Tailings Storage Options

Project alternatives have already been explored to some degree through the Provincial EA process undertaken by BML in the mid-1990s (Burin Minerals Limited, 1995). The focus of this EA was on proposed tailings disposal. Five alternatives were evaluated, as follows:

- Underground disposal in mine openings;
- Marine disposal;
- Hillside disposal near northeast end of Shoal Cove Pond;
- Hillside disposal near south end of Shoal Cove Pond; and
- In-pond disposal in Shoal Cove Pond.

The last of these was identified as the preferred alternative for a number of reasons, and the provincial government accepted this option by approving the project and releasing BML from further EA. BML has recently re-evaluated this preferred concept and has refined the layout (see Section 3.10.2.5).

The preferred option and its refined concept will be investigated further as project design and public consultations progress, and the results will be presented to and discussed with regulatory authorities and the public as part of the EA and/or permitting processes.

3.10.2.1 Underground Tailings Disposal

The underground disposal alternative was previously investigated by BML, with focus on the Blue Beach South Mine. It was determined that there was enough capacity for only 70,000 m^3 of tailings, which represents about five months of operations. Given this limited capacity combined with safety and logistical concerns, and constraints imposed on future mining caused by disposed tailings, underground disposal was discounted in the 1995 EPR as a viable option.

3.10.2.2 Marine Tailings Disposal

Marine disposal of tailings at Shoal Cove or a more distal ocean dumping site was also considered in the 1995 EPR. The conclusion drawn was that this option would not be acceptable to DFO and local fishers, and various technical, economic, environmental, and regulatory aspects made this unattractive as an option. Therefore, this alternative was also discounted as a viable option in the 1995 EPR.

3.10.2.3 Hillside Tailings Disposal (northeast end of Shoal Cove Pond)

This option would be constructed in two phases, the first of which would allow the storage and management of approximately 370,500 m^3 of tailings (See Figure 3-11). The first phase would involve the construction of a 10.4 m high dam to the northeast of Shoal Cove Pond, which would be approximately 732 m long. Water would be decanted into a coagulant station and pass into the existing settling pond at the base of the former tailings dam (northwest of Shoal Cove Pond) with the final discharge into Shoal Cove Pond as in the previous operation.

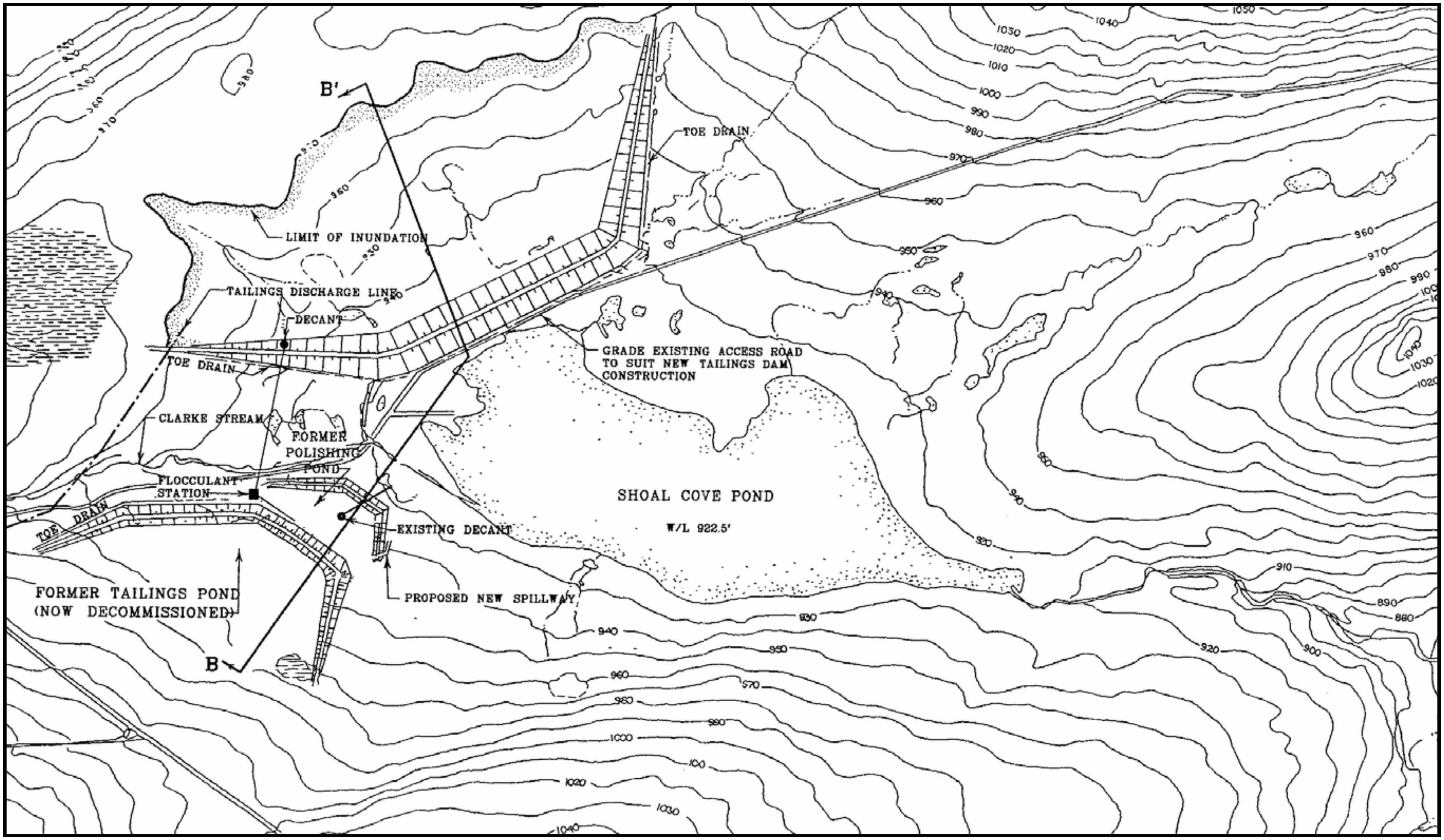


Figure 3-13: Hillside Tailings Disposal Alternative (northeast end of Shoal Cove Pond)

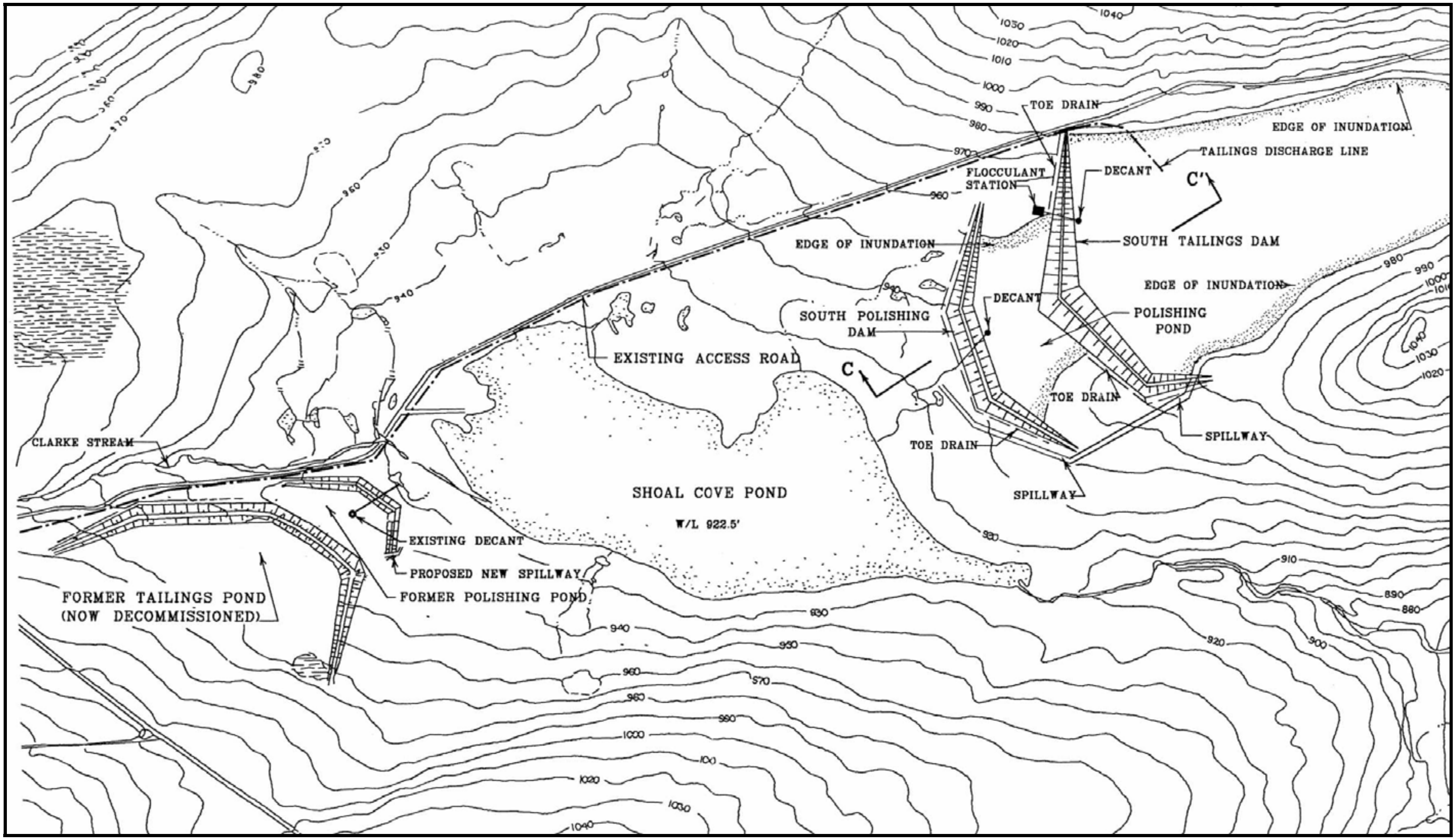


Figure 3-14: Hillside Tailings Disposal Alternative (south end of Shoal Cove Pond)

The second phase would involve raising the dam to total height of approximately 16.5 m and lengthening it to approximately 945 m. The expansion of the dam would provide an additional 580,000 m^3 for tailings management allowing for storage throughout the Project's lifespan.

This option would not allow control of outflow from Shoal Cove Pond and the old tailings that it contains.

3.10.2.4 Hillside Tailings Disposal (south end of Shoal Cove Pond)

This alternative would be constructed in one phase and would consist of a tailings pond dam and a polishing pond dam located to the south of Shoal Cove Pond (See Figure 3-12). The tailings dam would be approximately 12.2 m high and 503 m long. This option would provide approximately 900,000 m^3 of storage space, sufficient for the Project's lifespan. The water would be decanted into a coagulant station and pass into a settling pond located immediately north of the tailings dam with the final discharge into Shoal Cove Pond. The polishing dam would be approximately 4.2 m high and 396 m long.

This option would not address effluent leaving Minworth's tailings disposal facility, nor would it allow control of outflow from Shoal Cove Pond and the old tailings that it contains.

3.10.2.5 Shoal Cove Pond Tailings Disposal

As presented in the 1995 EPR, this alternative had two dams, one to contain tailings within most of Shoal Cove Pond and a second to contain a downstream polishing pond (see Figure 3-15). The tailings dam would be 6.1 m high and about 220 m long, and would contain tailings to roughly 3.5 m above the water level of the existing pond. The downstream polishing pond dam would provide further clarification of the water prior to discharge to the receiving environment of Shoal Cove Pond Brook.

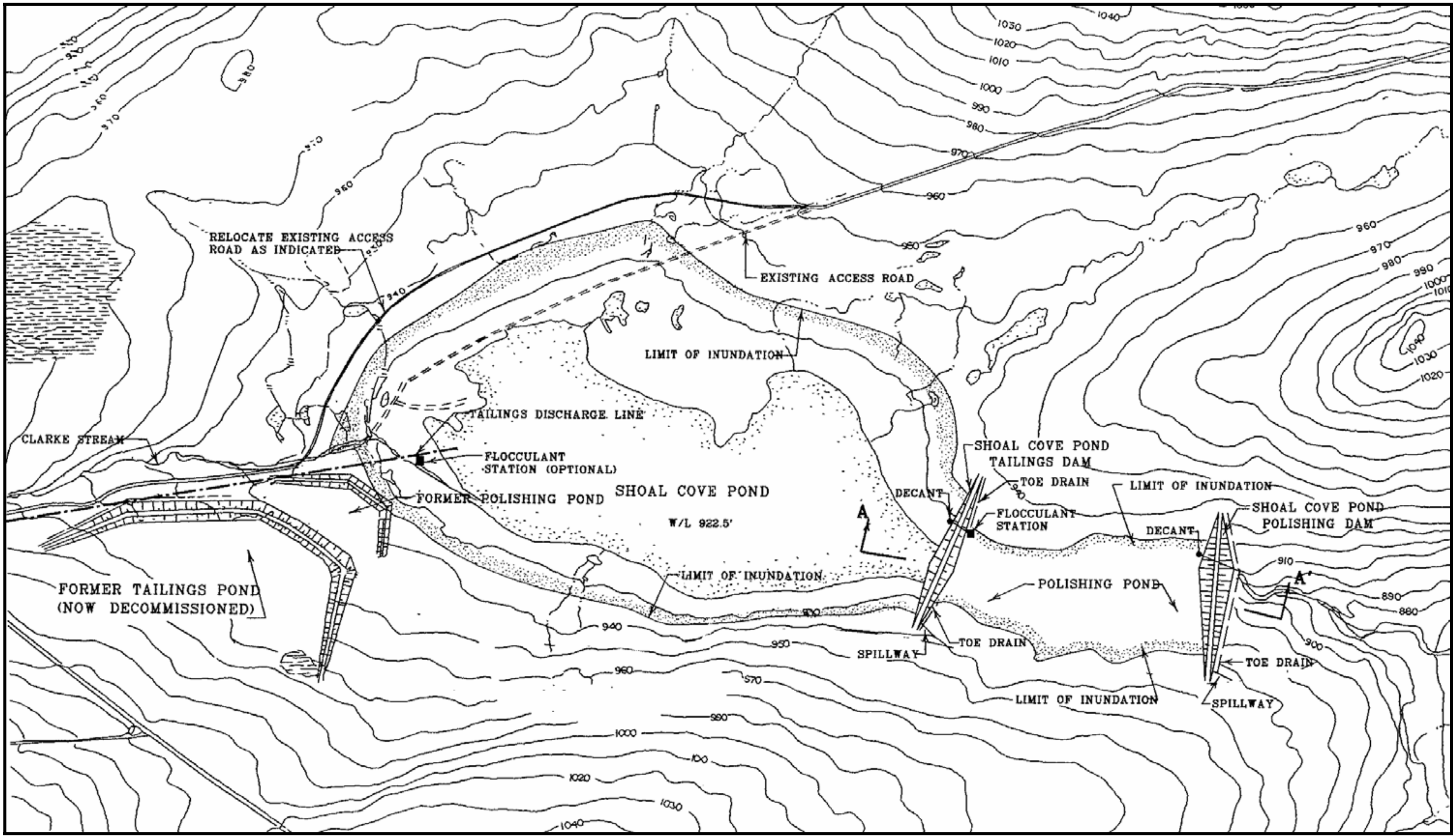


Figure 3-15: Shoal Cove Pond Tailings Disposal (1995 Design)

The refined concept currently being developed for this alternative will include two tailings cells and a polishing pond which will be separated by three earth fill dams (see Figure 3-16). During the first half of mine operations, Cell 1 will act as the initial tailings storage area while Cell 2 will act as the polishing pond. The internal dam separating Cell 1 and 2 will be a pervious structure comprised of clean rockfill. The solids will be retained in Cell 1 and the supernatant and tailings pore water will report to Cell 2. A flocculent may be added to Cell 2 if required. The impoundment dam containing Cell 2 will be constructed as a low permeability structure. The purpose of having a low permeability structure is to ensure containment if there is ever a problem with the tailings pond water quality. During normal mine operations, excess water will be allowed to decant from Cell 2 through an engineered spillway to the environment.

During the second half of mine operations, Cell 2 will be used for tailings deposition. For this phase of deposition, the containment dam will be raised to final grade and a new polishing pond will be constructed downstream. The polishing pond dam will have an emergency spillway with a weir so that the quality and discharge volume can be monitored. It is important to note that the discharge requirements for the TMF will be met at all times.

Construction materials for the tailings dams will be obtained from an on-site quarry and material borrow pits, which will be developed in conjunction with mine construction.

This revised TMF design will provide better containment of the tailings and full storage utilization of Shoal Cove Pond. It will also provide different options for closure including a vegetated cover or water cover depending on final design considerations. The design also allows for flexibility and expansion should additional reserves be found during the course of mining.

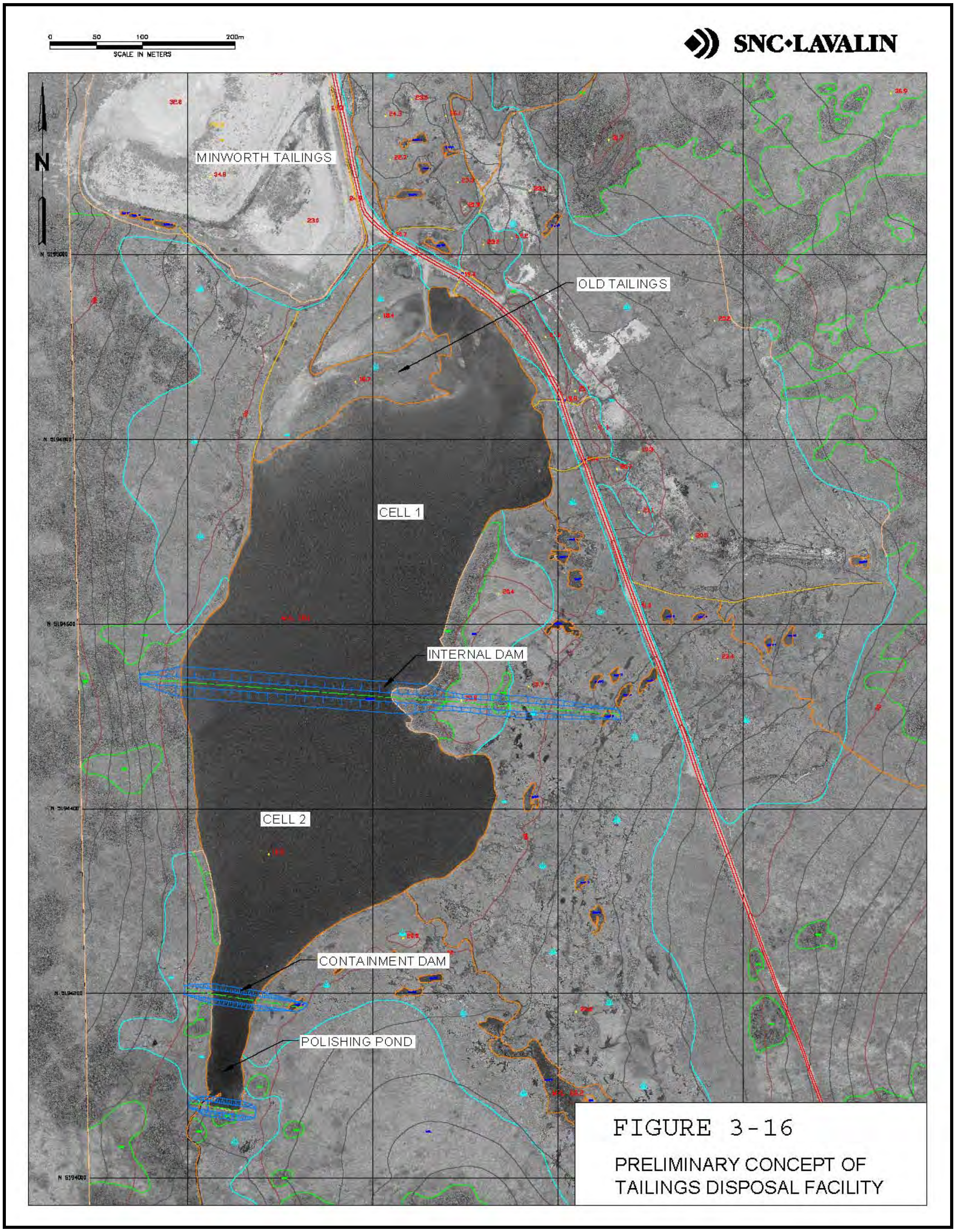


Figure 3-16: Preliminary Concept of Tailings Management Facility

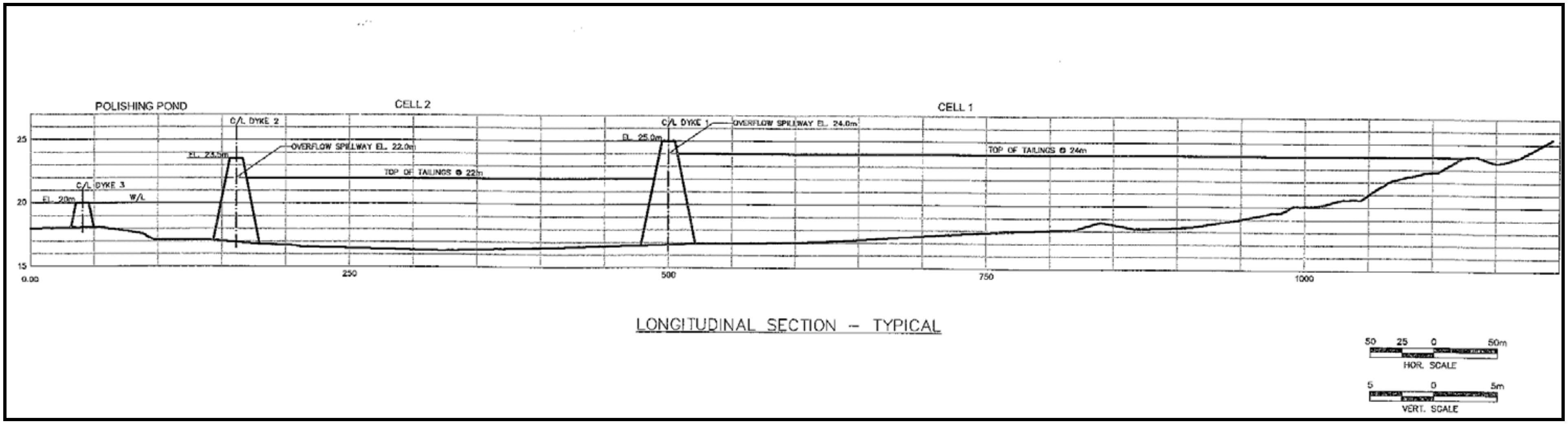


Figure 3-17: Shoal Cove Pond Tailings Management Facility - Dam Cross Section

3.10.2.6 Preferred Tailings Disposal Alternative

Through consideration of all design and economic factors, Burin Minerals Ltd. has concluded that the Shoal Cove Pond disposal concept, described above in Section 3.10.2.5 represents the best alternative for containment, operations and closure of the tailings pond and thus is selected as the preferred design for the Tailings Management Facility.

3.10.3 Marine Terminal Design

Burin Minerals proposes to construct a new marine terminal at Blue Beach in outer Great St Lawrence Harbour. This location offers several advantages, including close proximity to the required water depth (10 – 15 m) to support the design ship (10,000 to 65,000 DWT) without dredging; the 15 m contour is only about 200m from the shoreline, the site is sheltered from large open-ocean waves and swell; offers good and safe navigation access to the wharf; good land access to the terminal; sufficient lands for storage and laydown areas, for current and future expansion, if needed; and finally this site offers no interference with the existing marine operations in the St. Lawrence Harbour.

Two preliminary wharf sites have been selected in the Blue Beach area of Greater St. Lawrence Harbour. There are many factors to be considered in selecting a port site. The initial site review will focus on the following factors, shortest distance from shore, protection from prevailing wind and sea conditions and ease of vessel maneuvering. As the study progresses and data becomes available other factors such as cost, schedule, environmental etc., will also affect the final wharf site selection.

The preliminary site selection has been made based on our current knowledge of the area and the available data. Section 3.3.2 presents the design currently being used in project plans. Before a final selection is made site-specific data is required to confirm the wharf location. This data consists of:

- Bathymetry:
  - A survey of the potential wharf sites will be untaken to confirm water depths and seabed contours.

- Geotechnical:
  - A marine borehole program will be undertaken to determine the characteristics of the sub-sea strata at the potential sites.
- Environmental:
  - An underwater survey will be performed to assess the marine habitat at the potential sites.

There are several advantages and disadvantages associated with each marine terminal design presented in Figures 3-18 and 3-19 below.

Advantages of Layout I (Figure 3-18) include: shorter distance from storage building for loading; wharf designs offers protection to Blue Beach; orientation allows a small boat basin on northern side of wharf; and a second berth could be accommodated on southern side of wharf.

Disadvantages of Layout I include: irregular seabed contours; ship berth beam face prevailing winds (NW) and waves (SE); less room would be available for vessel manoeuvring.

Advantages of Layout II (Figure 3-19) include: ships would berth parallel to prevailing waves (SE); more room for vessel manoeuvring; consistent seabed contours.

Disadvantages of Layout II include: longer distance from storage building for loading; cannot accommodate a second berth due to shallower water depths.

Previous operations at St. Lawrence used a wharf located in the inner harbour. This presented Health & Safety concerns to mine/mill workers as well as residents of the community, in that mine traffic had to use public roads through the community to transport product to the dock. A steep road connecting the mill to the dock presented an ongoing safety hazard, and in fact a near miss in the 1970s, occurred when the brakes failed on a vehicle while it was descending the hill towards the dock. Fortunately, the vehicle came to a stop on the dock after hitting a small building and no injures other than damage to the building and the vehicle.

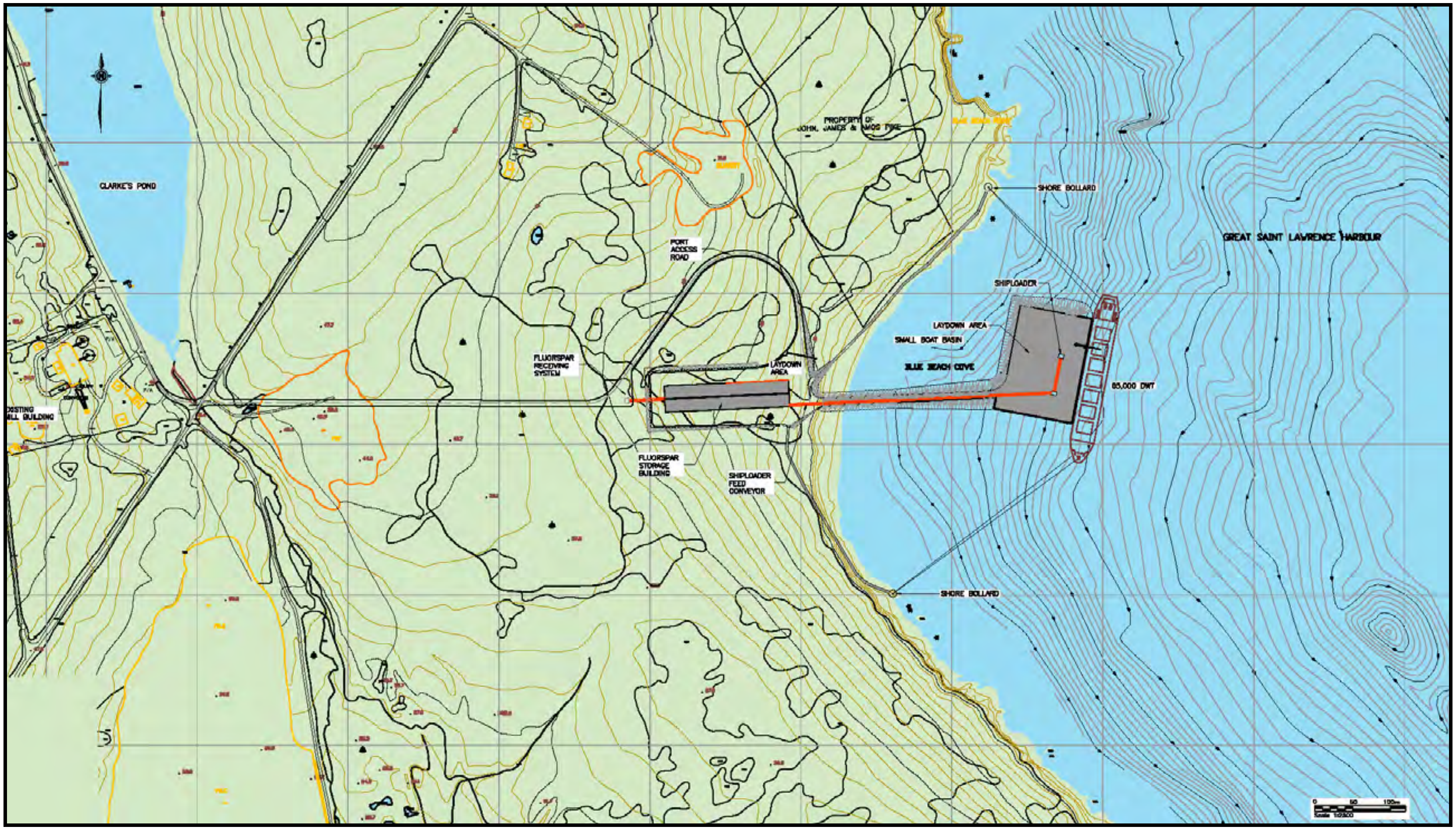


Figure 3-18: Marine Terminal Layout I

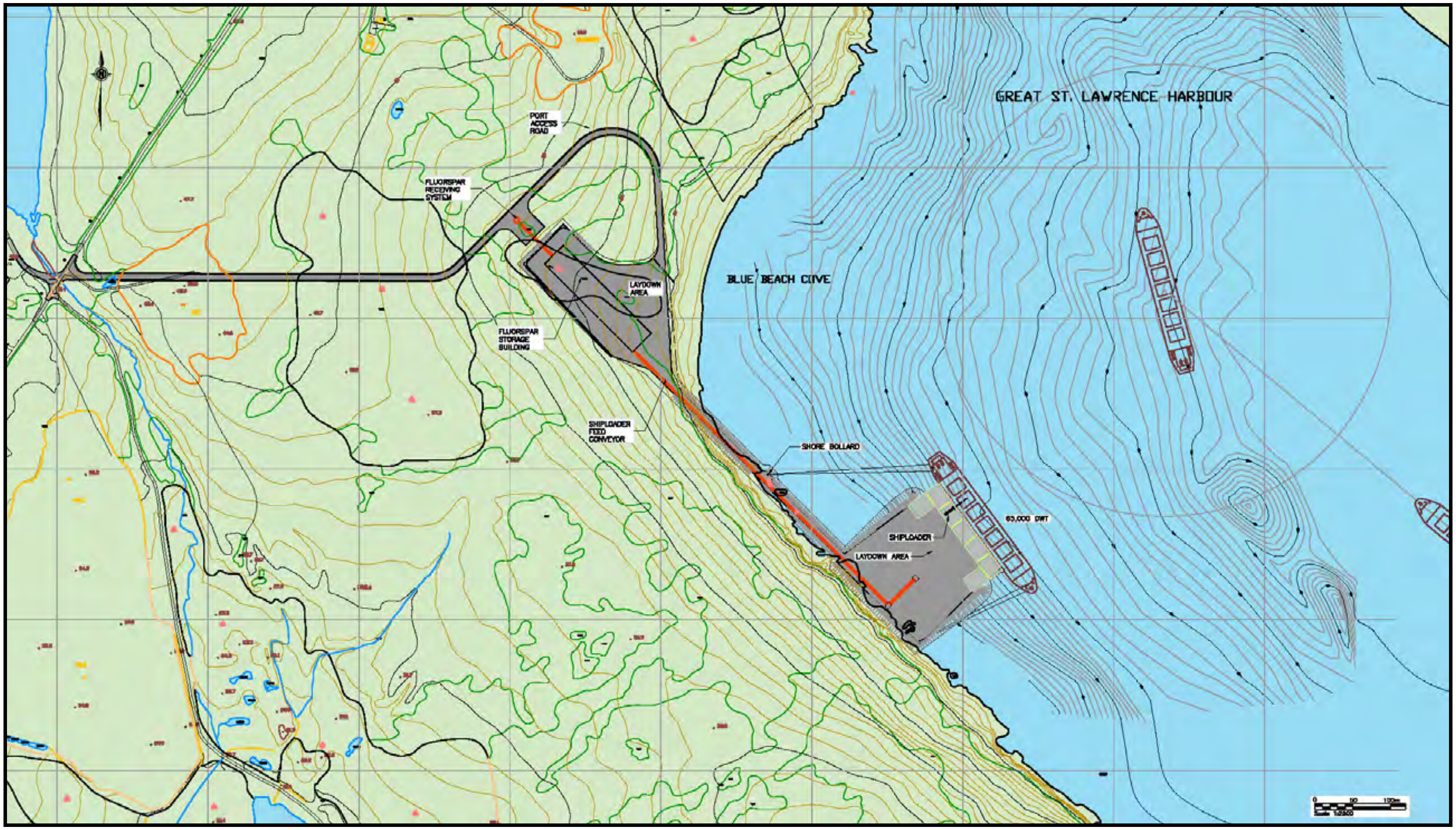


Figure 3-19: Marine Terminal Layout II

Another concern of past operations relates to high winds at the dock, which sometimes dispersed fine-powdered concentrate throughout the community. Although BML proposes to have control mechanisms in place to reduce dust emissions, the location of a new marine terminal further from the community will also help to mitigate potential impacts on area residents and businesses.

In recognition of the above, the Town of St. Lawrence amended its municipal plan several years ago to allow construction of a new marine terminal to service the reopening mine. It was recognized that such a terminal would be best suited at Blue Beach, and for that reason this area was specifically named during the town's public consultation process in support of the amendment.

3.10.4 Underground Mines

As previously mentioned, there are three major mineralized ore bodies in St Lawrence: Tarefare, Director, and Blue Beach Veins. Blue Beach is divided into Blue Beach North (BBN) and Blue Beach South (BBS). Although the latter two are approximately co-linear, the ore is markedly different. For that reason, there is some question as to whether or not both ore bodies are part of the same vein.

Burin Minerals Ltd. proposes to mine Tarefare and Blue Beach North. At this time it hasn't been decided which ore body will be mined first, but the plan is to mine them sequentially.

BBN was the first mine targeted in 1995 when Burin Minerals Ltd. took over the property. Minworth had recently mined that vein and had carried out extensive underground development in the 1980s. It was felt to be the cheapest and fastest mine to re-start. However ore quality was not as good as at Tarefare or Director, the known major veins in the area. BBN also offers some operational challenges due to poor ground conditions and thus was considered potentially more costly to mine than Tarefare, but less costly than Director.

Burin Minerals Ltd.'s internal feasibility work of 1997/98 did not identify enough ore in any one mine to economically justify the start up capital. For that reason, BML looked at Director or Tarefare in combination with BBN.

Director was ruled out fairly quickly because of the initial high cost to develop it. Mineral resources were deep since Alcan had already mined out the shallow levels. A deep, new shaft would be required. The developed resources in Director carried with it a number of operational problems. Ground pressure in the deeper portion of the mine resulting from "live" backfill above made mining very challenging and expensive. Water input into the Director mine was recorded at 3,300 gpm during Alcan days giving rise to expensive pumping costs. Also, potential for new resources in Director was split between the north and south ends of the deposit on both ends of old mine workings making it difficult to justify operating from one new shaft. A second shaft was likely to be required making the project uneconomical as an initial start up operation.

In addition, the old shaft at Director is not considered reusable since Alcan had experienced "pinching" (i.e. ground pressure) before it shut down in 1977/78. After the mine was flooded in 1978, there is likely little or no chance of going back into the main Director shaft for production purposes.

The new shaft built at Tarefare (known as No. 2) before Alcan closed down in 1978 goes all the way to the bottom of the deposit. It allows mining from the bottom up reducing potential for rock mechanics problems similar to those experienced at Director (and BBN) in the past. This shaft is sunk in granite at a distance sufficiently far (75 m) from the ore body, which ensured its stability. It is round and concrete-lined for further stability and provides a certain degree of water-proofing due to the concrete liner. Old shafts elsewhere were sunk in the vein, which caused weakening of the shaft walls as mining advanced. Plus, these shafts were generally wet from water following the vein structures and entering the shaft where men and equipment were lowered and hoisted.

Tarefare is deeper than Director or BBN, but water inflows are not expected to be significantly greater as the granite becomes tighter with depth. These inflows will be pumped from the shaft and discharged to local streams.

Tarefare vein is considered more competent then Director or BBN, thus presenting less ground problems. The shaft located away from the ore body and sunk to full depth provides opportunity for an efficient pumping system and greater control on water and airflow throughout the mine providing improved working conditions for the miners.

Blue Beach South was eliminated because the ore cannot be processed economically to AG specification. Neither Alcan nor Minworth could process the ore. The fluorspar is so tightly disseminated within the host granite that to release it in the milling process would cause the grind to be too fine to meet the end-users' specifications.

4 BIO-PHYSICAL SITE INFORMATION

4.1 METEOROLOGY AND CLIMATE

4.1.1 Climate

The climate in this area is heavily influenced by its coastal location. Summers are cool and winters are the mildest in the province with no permanent snow cover. The frequency of fog during the spring and summer is very high (PAA, 2008).

The average daily temperature for St. Lawrence is 4.4°C and average monthly precipitation ranges from 106.4 to 157.4 mm (annual precipitation is 1564.1 mm) (Environment Canada, 2008).

A SmartBay meteorological /oceanographic buoy is located at the mouth of Placentia Bay (46° 58.9' N, 54° 41.1' W), less than 60 km from St. Lawrence harbour. This buoy measures a variety of atmospheric and surface conditions including, wind speed and direction, air temperature, humidity, dew point, barometric pressure, water temperature, salinity, current speed, current direction, wave height, wave direction and wave period (SmartBay, 2009). A meteorological station is present near the Town of St. Lawrence which also provides long-term site-specific data for this study.

4.1.2 Offshore Wind and Wave Climate

The proposed location of the marine terminal is located at 46^{o} 54.0' 11.96" N Latitude and 55^{o} 23.0' 2.08" W Longitude. Given the surrounding headlands, the site is relatively sheltered from large ocean waves and swells.

The offshore wind and wave climate for the study area is well documented and understood. Extensive data is available from the sources listed below, which will be utilized throughout this environmental assessment:

- MacLaren Plansearch Limited /SNC-Lavalin (March 1991). Wind and Wave Climate Atlas, Volume 1 – The East Coast of Canada. Report prepared for Transportation Development Centre, Transport Canada. (Area 9 – South West Coast of Newfoundland, pages 9-1 to 9-22)

- Canadian Climate Centre (1991). Wind/Wave Hindcast Extremes for the East Coast of Canada, Volume I, Prepared by MacLaren Plansearch Limited & Oceanweather Inc. (Offshore grid points: #3738 at 46.875^o N, 56.25^{o}W, and #3739 at 46.875^o N, 55.00^{o}W)
- The Msc50 Wind And Wave Climate Hindcast Data Base For North Atlantic. [Swail, V.R., V.J. Cardone, M. Ferguson, D.J. Gummer, E.L. Harris, E.A. Orelup, and A.T. Cox. 2006]

Analysis of this existing wind and wave data will allow for construction and operations of the marine facilities that can withstand extreme ocean conditions. The estimated extreme significant wave height offshore St. Lawrence for 50 and 100 year return periods (i.e., probability of occurrence of 0.02 and 0.10) are estimated to be 10.7 m with associated 29.1 m/s wind speed, and 11.2 m with associated 30.0 m/s wind speeds, respectively (Canadian Climate Centre, 1991). These values are significantly reduced inside the harbour and at the proposed marine terminal.

The most frequent significant wave height offshore the St. Lawrence region is measured at approximately 2 m, as seen below in Figure 4-1. Figure 4-2 demonstrates that significant waves most frequently arrive from the southwest direction.

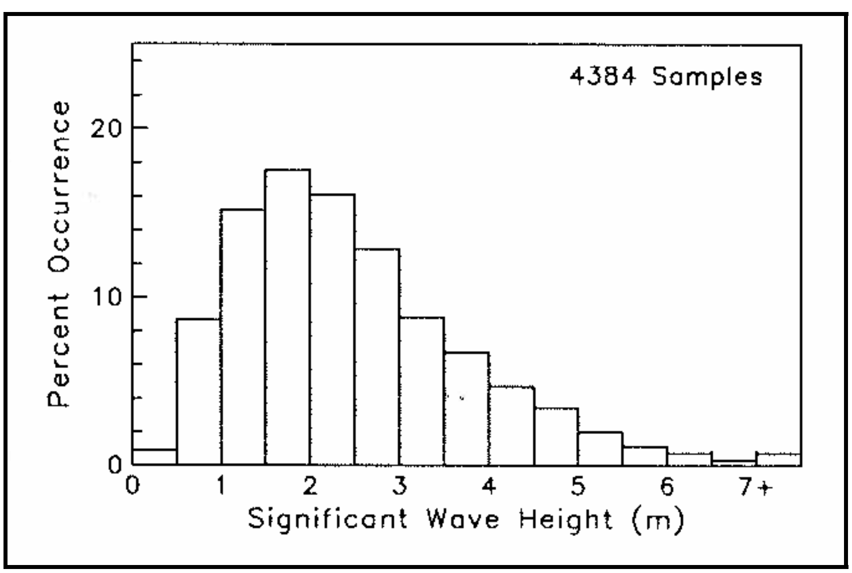


Figure 4-1: Significant Wave Height and Associated Percent Occurrence

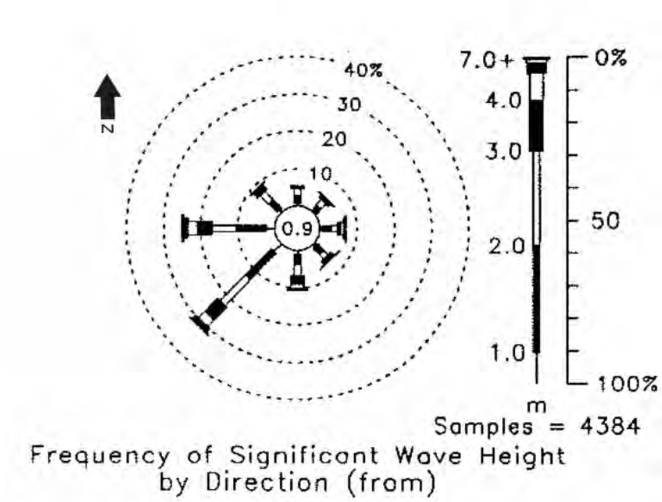


Figure 4-2: Frequency of Significant Wave Height by Direction for the St. Lawrence Region (offshore)

The most frequent wind speeds experienced in the areas just offshore the St. Lawrence region are between 10-20 kts, as is seen in Figure 4-3. Figure 4-4 demonstrates winds in the region most frequently come from the western direction.

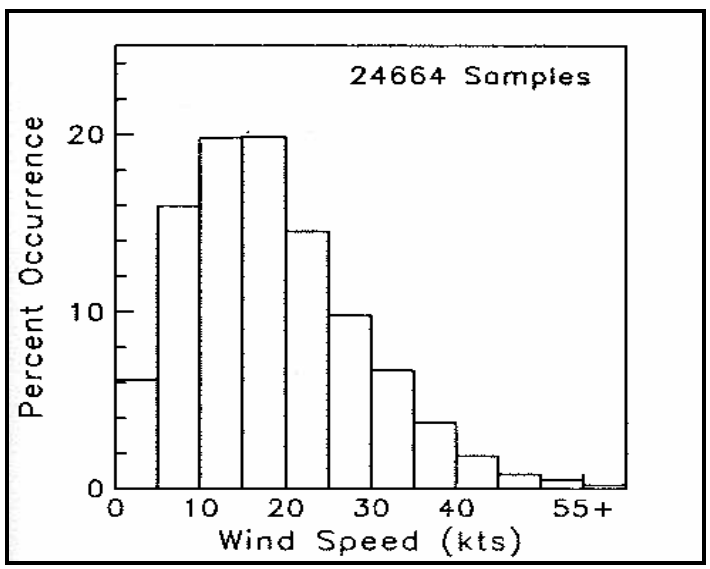


Figure 4-3: Wind Speed and Associated Percent Occurrence

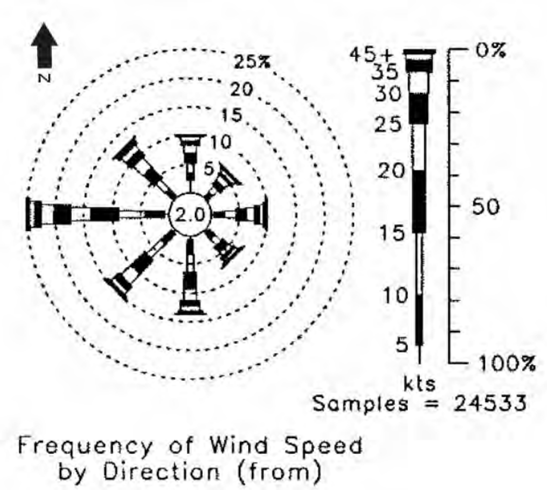


Figure 4-4: Frequency of Wind Speed by Direction

4.2 SOIL AND GEOLOGY

The bedrock geology of the Project area consists predominantly of the St. Lawrence Granite, which in the Carboniferous intruded older fine-grained clastic sediments and limestones of the Inlet Group, and the Late Precambrian volcanic and sedimentary rocks of the Burin and Marystown Groups. Fluorspar veins within the granitic host rock follow two major trends: a high grade (up to 95% fluorspar) group striking from 070° to 110°, and a set of lower grade (up to 70% fluorspar) veins trending 140° to 160°.

Based on recent NLDNR surface geology mapping (DNR 2005), soils in the area generally consist of a relatively thin (i.e. <1.5 m thick) glacial till over much of the mine/mill area and around Shoal Cove Pond[6], together with prominent NNE trending drumlins. On higher ground to the northeast, areas of bog underlain by glacial till predominate. At the highest topographic levels, such as the hills of Cape Chapeau Rouge, bedrock is exposed or covered by a thin veneer of soil.

[6] However, recent geotechnical drilling carried out on behalf of BML around Shoal Cove Pond indicate 3 to 9 m of till in this area.

5 TERRESTRIAL & FRESHWATER BIOLOGICAL ENVIRONMENT

5.1 MAMMALS

As was identified in the 2001 St. Lawrence Wind Power Demonstration Project Registration document (Newind Group, 2001), submitted to the NL Department of Environment and Conservation, red fox and coyotes have been identified in the St. Lawrence area. Due to the habitat in this area, moose are not observed in high numbers but have also been found in this area. Several small mammals, such as snowshoe hare, red squirrels, and artic hare (in areas of higher elevation) have also been seen in this area. As was also identified in the Newind Group report, caribou have not been seen in the St. Lawrence area for a number of years and black bears are rarely observed.

5.2 BIRDS

Seventy-four species of land-based birds were observed within and around the St. Lawrence area during surveys for the St. Lawrence Wind Demonstration Project throughout 1998 to 2001. Surveys were completed during both the spring and fall. An example of species regularly observed during the spring surveys include (Jacques Whitford, 2003):

- Common Raven
- Northern Harrier
- American Black Duck
- Ruby-crowned Kinglet
- Savannah Sparrow
- Willow Ptarmigan
- Osprey
- Canada Goose
- Herring Gull
- White-throated Sparrow
- Swamp Sparrow
- Rough-legged Hawk
- Greater Yellowlegs
- Common Snipe
- Yellow-rumped Warbler
- Horned Lark

Protected terrestrial bird species are provided in Section 5.4, and include the Red Crossbill (*percna* subspecies); Short-Eared Owl; Peregrine Falcon (*anatum* subspecies).

During surveys completed for the St. Lawrence Wind Demonstration Project, the Red Crossbill and Peregrine Falcon (subspecies not specified) were observed within the

Town of St. Lawrence. The Short-Eared Owl was not observed during surveys completed during daylight.

5.3 FRESHWATER FISH AND FISH HABITAT

As in most of the province, many of the ponds in the St. Lawrence area have brook trout. There are also two scheduled salmon rivers in this area, specifically the St. Lawrence River and Lawn River.

During the previous environmental assessment for this project (Burin Minerals Ltd., 1995), fish habitat surveys were conducted as part of the requirements of the Department of Fisheries and Oceans' (DFO) No Net Loss Compensation. Cobble and boulders, as well as some gravel and bedrock, were found to dominate the substrate in this system.

Surveys were also completed for Shoal Cove Pond, which appeared to have been impacted by past mine discharges and erosion. This area was indicated to not be good habitat for fish. It was specified that the fish in Clarke's Pond is healthier, longer, heavier and more abundant than in Shoal Cove Pond.

As described in Section 3.3.7.1, a freshwater sampling/testing program will begin in the spring of 2009 and will be repeated in summer). This sampling program will include 15 surface water-sampling locations within the Shoal Cove Pond watershed and Salt Cove Brook, as well as bore-hole groundwater sampling, and Blue Beach North and Tarefare mine shaft sampling. This program will provide information on the characteristics of the groundwater; 'ground truth' previously collected data (mid-1990s), and allow for the development of a clear baseline for freshwater quality.

5.3.1 Freshwater Fish Habitat

The following ponds and streams are within the proposed project footprint or within the general project area:

- Shoal Cove Pond (former and proposed TMF);
- Clarke's Pond (upstream of the TMF adjacent to the mill);
- Shoal Cove Pond Brook (former and proposed outflow of the TMF);

- Clarke's Pond Brook (majority of this stream is upstream of the TMF);

Additional water bodies near the project area will be surveyed, as required by DFO, in order to provide supplementary information. DFO will be consulted if project planning identifies that any of the additional water bodies may be potentially affected.

5.3.1.1 Shoal Cove Pond

Shoal Cove Pond is estimated to have a total surface area of 15.7 ha, maximum depth of approximately 1.8 m and bottom substrate consisting of a thick layer of fine silt. Only brook trout (*Salvelinus fontinalis*) and American eel (*Anguilla rostrata*) have been identified as fish species that inhabit the pond. Portions of the pond have previously been identified as having emergent aquatic vegetation (northeast corner, east side and southeast corner). As is presently observed and was identified in the 1997 CEAA Screening Report, the north end of the pond is partially infilled with tailings from previous mining activities.

Information provided in the 1995 EPR has been used to offer a preliminary quantification of Shoal Cove Pond using the methods outlined in Bradbury et al. (2001). A Condition Index does not appear to have been applied to the habitat as described in previous EA documents and hence, one was not applied within the new quantification provided below. Preliminary Habitat Equivalent Units within Shoal Cove Pond were determined for each fish species present assuming both 25% emergent vegetation and no emergent vegetation (see Table 5.1) present.

Table 5.1: Habitat equivalent units of Shoal Cove Pond based upon Habitat Suitability Indices

<table>
<tr><th rowspan="3">Species</th><th colspan="3">Habitat Equivalent Units (ha)</th></tr>
<tr><th colspan="2">Aquatic Vegetation Present</th><th rowspan="2">Aquatic Vegetation Absent</th></tr>
<tr><th>Emergent vegetation (25% of surface area)</th><th>Remainder of Pond without Vegetation (75 % of surface area)</th></tr>
<tr><td>Brook Trout</td><td>3.07</td><td>7.77</td><td>10.36</td></tr>
<tr><td>American Eel</td><td>0</td><td>11.77</td><td>15.7</td></tr>
</table>

5.3.1.2 Shoal Cove Pond Brook

Shoal Cove Pond Brook is the outflow from Shoal Cove Pond to Shoal Cove (marine). This brook is estimated to be approximately 1.5 m in width and 600 m long. This brook has previously been quantified as 32 units (1 unit =100 m^2) of Type IIa[7] habitat, with small pockets of Type III (migratory habitat, faster flow and larger substrate) and Type IV (overwintering/poor rearing habitat, steadies and muddy substrate). Shifting of the substrate on the section of beach through which this brook flows causes “alternating surface flow and percolation at the outlet”, resulting in limited access potential for anadomous salmonids (CEAA Screening Report, 1997).

5.3.1.3 Clarke’s Pond

Clarke’s Pond has a surface area of approximately 10 ha and an average depth of 1.5m. Principal water supply sources for this pond are ground water and underground springs. The area surrounding the pond is vegetated with grass, alders, spruce and dir. The 1997 CEAA Screening Report indicates that the shoreline of this pond was stable at this time, and this appears to presently be the case as well.

5.3.1.4 Clarke’s Pond Brook

Freshwater surveys previously completed for the 1995 EPR and the 1997 CEAA Screening Report indicate that Clarke’s Pond Brook ranged from 2-4 m in width. It is estimated that the lower 120 m section of stream would be inundated due to tailings deposition (1995 EPR). Vegetation along upper and middle sections of the stream include alder and grass, with some areas being more heavily vegetated than others. The entire stream is a total of approximately 1,000 m long. The stream has been previously been quantified as 20 units of Type II fish habitat.

[7] “Good salmonid rearing habitat, limited spawning in isolated gravel pockets. Good feeding and holding areas for larger fish in deeper pools, pockets or backwater eddies. Flows = riddle to light rapid, current 0.3 to 1 m/s. Depth = variable, <1.5m. Substrate = large cobble to boulder and bedrock, some gravel pockets interspersed.” Habitat considered “impacted by human activity”.

5.3.1.5 Shoal Cove Pond Tributary Streams

Two small tributaries of Shoal Cove Pond are located within the TMF area. It is estimated that inundation might extend 60-90 m upstream of the small tributaries due to tailings deposition.

5.3.2 Freshwater Species

Previously completed surveys (electrofishing and fyke netting) indicated that Shoal Cove watershed serves as habitat for resident Brook Trout (*Salvelinus fontinalis*) populations and American Eel (*Anguilla rostrata*). Brook Trout were found throughout the entire system, while Eel were found in very low numbers.

5.3.2.1 Brook Trout

Brook trout are common throughout the province of Newfoundland and Labrador. This species can be anadromous (living near shore for one to two months per year) or found in landlocked water systems. Within this province spawning occurs between late September and early November. Brook trout usually mature at two to four years of age, and rarely live longer than five or six years (NLRC EIS, 2007). Habitat preferences include a pH between 6.5 to 8.0, streams with plentiful bank and instream cover, and lakes with cold, clear waters (NL DOEC Wildlife Brach, 2009).

5.3.2.2 American Eel

American eels are also common throughout the province and can be found in most lakes and rivers that lead to the ocean. This species has a snake-like appearance, with a small, pointed head. They are found in both freshwater and saltwater. Young are found in freshwater and eventually travel into saltwater to spawn near the Sargasso Sea. They are noctural; feeding at night and spending most of their day under rocks/logs or buried in mud (NL DOEC Wildlife Brach, 2009).

5.4 VEGETATION

St. Lawrence falls within the Eastern Hyper-Oceanic Barrens Ecoregion. Tree cover within the Eastern Hyper-Oceanic Barrens Ecoregion is limited. Trees are stunted and form areas of tuckamore consisting mainly of balsam fir. The typical vegetation in this ecoregion consists of coastal barrens of heath moss, as well as plateau and blanket bogs in many areas. Patridgeberries, bakeapples, and blueberries are commonly found in this ecoregion. The growing season runs for approximately 150 days (PAA, 2008). Mossy, bog conditions are common in this region.

Of the plants protected under the provincial *Endangered Species Act* or the Federal *Species at Risk Act*, none are known to occur within or near the project area.

5.5 SPECIES AT RISK

Three differing bodies designate Species at Risk. Species can be designated provincially under the *Endangered Species Act*, federally by the *Species at Risk Act*, or also by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) who operate independently of government. The following terrestrial species are considered at risk under the *Newfoundland Labrador Endangered Species Act (NLESA)* and/or the *Species at Risk Act (SARA)*. For each, their status designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is also provided.

Table 5.2: Protected Terrestrial Species Possibly found in the Study Area

SPECIES		SCIENTIFIC NAME	SARA STATUS	NL ESA STATUS	COSEWIC STATUS
Fish	Banded Killifish	*Fundulus diaphanous*	Special Concern (Schedule 1)	Vulnerable	Banded Killifish
Birds	Red Crossbill (percna subspecies)	*Loxia curvirostra percna*	Endangered (Schedule 1)	-	Endangered
	Short-Eared Owl	*Asio flammeus*	Special Concern (Schedule 1)	Vulnerable	Special Concern
	Peregrine Falcon (*anatum*)	*Falco peregrinus anatum*	Threatened	Threatened	Special Concern
Invertebrate	Monarch Butterfly	*Danaus plexippus*	Special Concern (Schedule 1)	-	Special Concern

The Banded Killifish was not observed during freshwater surveys completed for this project in the past (e.g.: 1995).

During surveys for completed the St. Lawrence Wind Demonstration Project, the Red Crossbill and Peregrine Falcon (subspecies not specified) were observed within the Town of St. Lawrence. The Short-Eared Owl is expected to be found in this area but was not observed during surveys completed during daylight.

6 MARINE BIOLOGICAL ENVIRONMENT

6.1 MARINE FISH AND FISH HABITAT

The two primary sources of information on macroinvertebrates, fishes and commercial fisheries in the vicinity of Great St. Lawrence Harbour include:

- DFO Newfoundland and Labrador commercial landings database; and
- Local ecological knowledge (LEK).

6.1.1 Commercial Landings Database

Based on DFO commercial landings data for 2005 to 2007, the primary commercial species caught in the vicinity of Great St. Lawrence Harbour were Atlantic cod (*Gadus morhua*) and American plaice (*Hippoglossoides platessoides*) (Table 6.1; Figure 6-1). The Great St. Lawrence Harbour area examined for commercial catches was arbitrarily chosen and is defined by the following corner coordinates (Figure 6-1).

- 46º56'N, 55º25'W
- 46º56'N, 55º20'W
- 46º50'N, 55º25'W
- 46º50'N, 55º20'W

Table 6.1: Catch Weights and Catch Values for St. Lawrence Harbour Area, 2005 to 2007

Species	2005		2006		2007	
	Weight (kg)	Value ($)	Weight (kg)	Value ($)	Weight (kg)	Value ($)
Atlantic cod	5,604	5,879	3,530	3,994	11,059	16,172
American plaice	715	470	495	347	1,601	1,033
Snow Crab	1,226	3,919	0	0	0	0
Halibut	16	102	0	0	0	0
Skate	0	0	47	14	0	0
Total	7,561	10,370	4,072	4,355	12,660	17,205

Source: DFO Newfoundland and Labrador commercial landings database.

All reported geo-referenced catches for 2005-2007 occurred outside of Great St. Lawrence Harbour (and Blue Beach Cove) (Figure 6-1). It should be noted that some commercial species, such as lobster, are not reflected in the commercial landings data because catch locations are not geo-referenced.

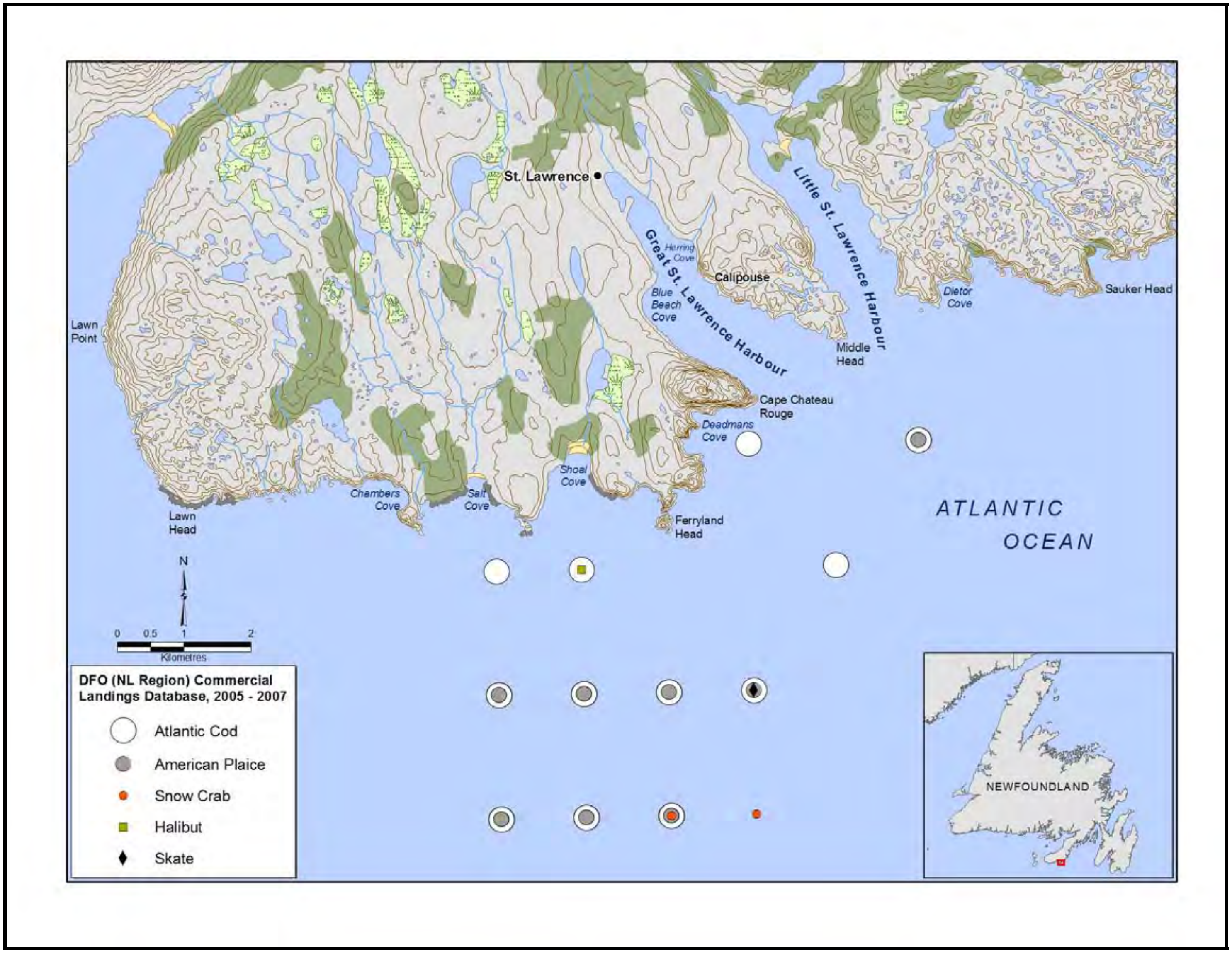


Figure 6-1: Commercial Fisheries Landings in the St. Lawrence Region 2005 - 2007

Other species harvested in the general area include snow crab (*Chionoecetes opilio*), Atlantic halibut (*Hippoglossus hippoglossus*), and skate; however, these species were not harvested in all years over the three-year period examined (Table 6.1). When harvested, skate and halibut represented comparatively low yields.

6.1.2 Local Ecological Knowledge

In addition to DFO commercial landings data, local knowledge was used to determine potential active fisheries occurring in the Blue Beach Cove area. One source of LEK used was the Community-Based Coastal Resource Inventory (CCRI) project. The Burin Peninsula portion of this LEK database was completed by DFO, Newfoundland Region, during fall and winter, 1998-1999 (DFO, 2000). The CCRI project area for the Burin Peninsula covered coastal areas between Friar Head (Fortune Bay) and Davis Cove (Placentia Bay). Information concerning coastal fisheries resources and other data types were collected for the CCRI through interviews with knowledgeable individuals and stakeholders, most notably retired and active fishermen. Those being interviewed were asked to identify areas where specific resources (e.g., groundfish, pelagics, shellfish, marine mammals, marine vegetation, etc.) were known to occur. The identified areas were mapped after the information was verified by at least three independent sources. Because the mapped data are qualitative, the information must be interpreted with caution and used only as a general guide.

The CCRI information for the Great St. Lawrence Harbour area was accessed online using the public DFO GeoBrowser v5.0 (DFO 2009). The arbitrarily-chosen area assessed for CCRI extended from Shoal Cove to Bight Cove and included marine areas 1.5 to 3.0 km from shore (see Figure 6-2).

The LEK collected for the CCRI indicated fisheries for groundfish (lumpfish *Cyclopterus lumpus*, Atlantic cod, flounder), pelagic fishes (capelin, Atlantic herring *Clupea harengus harengus*, Atlantic mackerel *Scomber scombrus*), and invertebrates (American lobster, squid, crab) occur (or have occurred) within or near Great St. Lawrence Harbour. These fisheries are summarized in Table 6.2.

A discussion with a St. Lawrence fisherman (E. Jarvis, pers. comm. 2009) indicated that commercial fishing within Great St. Lawrence Harbour is now quite limited. Some lobster fishing occurs seasonally in Blue Beach Cove, and gill nets are sometimes set on the east side of Great St. Lawrence Harbour for a herring bait-fishery. Capelin traps were set in Blue Beach Cove historically but not during recent years. A limited recreational squid fishery also occurs in Great St. Lawrence Harbour when the opportunity arises. Mr. Jarvis (pers. comm.) indicated that most of the commercial fishery in the area is prosecuted outside of Great St. Lawrence Harbour. He said that both Atlantic cod and American plaice are fished primarily to the south and west of the harbour.

Figure 6-2: Area Assessed for Community-Based Coastal Resource Inventory for the St. Lawrence Area (map generated using DFO GeoBrowser v5.0)

Table 6.2: Fisheries Resources Located within Great St. Lawrence Harbour Based on the Burin Peninsula Community-Based Coastal Resource Inventory and Consultation with Fishermen

Species	Fishery Type	Season	Depth Fished (m)	Gear Type	Location
Atlantic mackerel	Bait	August-September	18	Mackerel nets	Great St. Lawrence Harbour
Atlantic herring	Bait	January-April	9 – 36	Seine nets, gillnets	Great St. Lawrence Harbour
Capelin	Observed	June	9 – 27	Seine, dip nets, buckets	Great St. Lawrence Harbour, including Blue Beach Cove
Atlantic cod	Commercial	June – October	27 – 90	Gillnets, cod trap, hook and line, trawl	South of Great St. Lawrence Harbour
Lumpfish	Commercial	May - June	11 – 45	Lump nets	Outside of Great St. Lawrence Harbour
Flounder	Commercial	May - October	90 – 108	Nets, hook and line	South of Lawn Point East to Ferryland Head
Squid	Recreational	August - September	4 – 18	Hook and line	Great St. Lawrence Harbour
Snow crab	Commercial	May - September	99 – 180	Crab pots	2-3 miles (3-5 km) outside of Great St. Lawrence Harbour
American lobster	Commercial	April - June	4 – 36	Lobster pots	West shore of Great St. Lawrence Harbour, including Blue Beach Cove

6.1.3 Marine Fish Habitat

Marine fish habitat as defined by DFO includes habitat for both marine invertebrates and finfish. There is limited available information on the fish habitat in Blue Beach Cove and thus this review uses information from the general vicinity (e.g., Great St. Lawrence Harbour). Photographs of the area suggest that the intertidal and shallow subtidal (<20 m) zones are characterized by hard substrate comprised of pebble and small cobble that is well rounded by wave action. Consultations with local fishermen indicate that Blue Beach Cove has a rocky, hard bottom. However, some mud substrate occurs in the deep parts of the harbour (E. Jarvis, pers. comm. 2009). Fishermen also indicate that the cove is characterized by high exposure and that high wave action is common in fall and winter at least until May. The occurrence of predominately hard, large particle substrates and high wave action suggests that the presence of eelgrass (*Zostera marina*) is highly unlikely. Macroalgae, both filamentous species and kelps, probably occur in the area.

Based on conversations with fishers and what is known about Newfoundland habitats, the rocky substrate of Blue Beach Cove provides habitat for American lobster (*Homarus americanus*) and possibly other benthic marine organisms that commonly occur in coastal Newfoundland waters, including cunner (*Tautogolabrus adspersus*), tomcod (*Microgadus tomcod*), sculpins (*Myoxocephalus spp.*), and winter flounder (*Pseudopleuronectes americanus*). These species were noted to occur in the general area of a wharf construction project in Great St. Lawrence Harbour (SCH, 2006). Blue Beach Cove is also known to provide spawning habitat for capelin (*Mallotus villosus*) (Sjare et al., 2003; DFO, 2009; E. Jarvis, pers. comm. 2009).

6.1.4 Aquaculture

The aquaculture industry in Newfoundland and Labrador is currently focusing on the development of four species, including Atlantic cod, Atlantic salmon (*Salmo salar*), steelhead trout (*Oncorhynchus mykiss*), and blue mussels (*Mytilus edulis*) (DFA 2009). Aquaculture is a rapidly growing industry in Newfoundland and Labrador. In 2006, approximately 10,500 t of product, with a value of roughly $52.3 million, was produced compared to 1,750 t nearly a decade earlier. Aquaculture sites around the island are largely concentrated on the northeastern and southern coast.

There are currently no aquaculture developments in the St. Lawrence Harbour area.

6.1.5 Pelagic Species

6.1.5.1 Atlantic Herring

Ranging from western Greenland to Cape Hatteras in the Northwest Atlantic, the Atlantic herring is primarily pelagic and often schools, particularly just prior to spawning. Along the Canadian coast, Atlantic herring may spawn in any month between April and October, but spawning is concentrated in May (spring spawners) and September (fall spawners) (Ahrens, 1993). Atlantic herring are demersal spawners depositing their adhesive eggs on stable bottom substrates (Scott and Scott 1988; Reid et al. 1999). In the Newfoundland region, spawning generally occurs in shallow (<20 m) coastal waters. Spring spawning usually occurs in shallower waters than fall spawning.

Atlantic herring prey on euphausiids, copepods, fish eggs, pteropods, mollusc larvae, and the larvae of finfishes, such as sandlance, silversides, capelin, and herring (Scott and Scott 1988). The species are important prey for many species including other fish, seabirds, and marine mammals, particularly harp, hooded, grey, and harbour seals (DFO, 2006a).

Defined by tagging studies carried out in the 1970s and early 1980s, five stock complexes, including the St. Mary's Bay-Placentia Bay complex, are recognized in the coastal waters of eastern and southern Newfoundland (Wheeler and Winters, 1984; Wheeler et al., 2006). Commercial landings for the St. Mary's Bay – Placentia Bay complex averaged 1,348 t from 2002 to 2006 (DFO, 2006a). In addition to landings from the commercial fishery, an estimated 150 t of herring is harvested annually for bait in Placentia Bay and St. Mary's Bay combined (DFO, 2006a). Atlantic herring has been historically harvested for bait in St. Lawrence Harbour using seines and nets (DFO, 2009).

The herring bait fishery occurs from January to April and the depths fished range from 9 to 36 m. The herring fishery in the St. Lawrence Harbour area was more prominent in the 1980s until the stock was overfished by seiners. Fish harvesters interviewed by Sjare et al. (2003) indicate herring aggregations occur throughout Great St. Lawrence Harbour; however, specific information on abundance, timing, and spawning areas was not provided. Gillnets are often set towards the east side of the harbour across from Blue Beach to target herring for bait (E. Jarvis, pers. comm. 2009).

6.1.5.2 Atlantic Mackerel

The Atlantic mackerel is a pelagic fish that ranges from North Carolina to Newfoundland in the Northwest Atlantic (DFO, 2008). Mackerel is found in inshore waters during spring and summer and in deeper, warmer offshore waters at the edge of the continental shelf during late fall and winter (DFO. 2008). There are two major spawning areas for mackerel in the Northwest Atlantic: (1) southern Gulf of St. Lawrence and (2) between the coasts of Rhode Island and Virginia (DFO, 2008). In

Canadian waters, spawning occurs during June and July while in American waters, it occurs from March to April (DFO, 2008).

Mackerel are prey for many predators, including groundfish (e.g., Atlantic cod), highly migratory pelagics (e.g. bluefin tuna, swordfish, sharks), and marine mammals (e.g., porpoises, harbour seals). Capturing prey by filter feeding or by individual selection of organisms, mackerel are predators on a large variety of planktonic animals, including amphipods, euphausiids, shrimps, crab larvae, small squid, fish eggs, and young finfish, including capelin and herring (Scott and Scott, 1988).

In the Maritime Provinces, Newfoundland, and Quebec (NAFO Subareas 3 and 4), over 15,000 commercial fishermen participate in the mackerel fishery (DFO 2008). They fish mainly inshore using gillnets, jiggers, handlines, purse seines and traps. The type of gear used varies according to the region and time of the year. According to LEK, mackerel are distributed along the eastern portion of Great St. Lawrence Harbour from Herring Cove to Calipouse (DFO, 2009). Atlantic mackerel are harvested from August through September in Herring Cove located on the eastern shore of Great St. Lawrence Harbour. Used as bait for the fall fisheries, the species is fished with mackerel nets to a depth of approximately 18 m (DFO, 2009).

Atlantic mackerel are not harvested in the vicinity of Blue Beach Cove.

6.1.5.3 Capelin

The capelin is a small marine fish of cold, deep waters, found in the Atlantic Ocean on the offshore banks and in coastal waters, occasionally spending the winter and early spring in deep bays off the coast of Newfoundland (Scott and Scott, 1988). After overwintering in offshore waters, capelin move shoreward in early spring to spawn on beaches throughout the region in the spring-summer, and return to offshore waters in autumn (Templeman, 1948). Beach spawning is demersal with the eggs being deposited in the intertidal zone. However, occurrence of egg masses indicate that subtidal spawning occurs to depths ranging from approximately one to 37 m and up to approximately 400 m from shore in years and areas where water temperatures on the beaches exceeds the preferred spawning temperatures (Templeman, 1948). In the Newfoundland region beach spawning may occur over a wide range of temperatures from 2.5 to 10.8°C (Frank and Leggett, 1981). Subtidal spawning is assumed to be variable from year-to-year.

The size of the substrate on the beach determines the suitability of the beach for spawning with capelin usually preferring gravel five to 15 mm in diameter. When the most favoured substrate is occupied, or not available because of tidal conditions beach spawning capelin may spawn on sand less than 2 mm in diameter or on larger gravel up to 25 mm in diameter. Capelin do not spawn on larger substrates or mud. However, it appears that eggs may incidentally adhere to rocks, large boulders, and macroalgae if present among preferred substrates. Subtidal spawning inshore appears to be predominantly on sand (Templeman, 1948).

Several capelin spawning beaches including Blue Beach Cove occur within Great St. Lawrence Harbour based on LEK collected by Sjare et al. (2003). Blue Beach Cove and Herring Cove were also noted as capelin spawning beaches by DFO (2009). Fish harvesters noted that capelin were small in size and abundance was too low to sustain a commercial fishery. Capelin were typically targeted with seines and dipnets, in addition to buckets on shore, in June at depths of 9 to 27 m. Capelin traps have also been used at Blue Beach in the past, but not in recent years (E. Jarvis, pers. comm. 2009). Capelin demersal spawning areas were not identified within Great St. Lawrence Harbour.

6.1.6 Groundfish

6.1.6.1 Atlantic cod

Atlantic cod have historically been distributed throughout Newfoundland and Labrador waters, including Placentia Bay (Scott and Scott, 1988). The distribution of cod within Placentia Bay varies seasonally. Most of the cod aggregate at specific spawning grounds within the bay during the spring. After spawning, cod disperse with many migrating to summer feeding grounds outside of the bay, predominately in an eastern direction. The cod return to over-wintering grounds in Placentia Bay during summer and fall. There is also evidence that suggests some cod remain in Placentia Bay year-round and others that enter the bay from the west during summer (Lawson and Rose 2000a).

In Placentia Bay, spawning occurs in the vicinity of the Bar Haven Island shoals and also in the outer bay off Cape St. Mary's and Oderin Bank (Lawson and Rose 2000b). Peak spawning generally occurs from April to June. Southwestward flowing currents are believed to carry the planktonic eggs and larvae out of the bay towards offshore banks, such as St. Pierre Bank and Burgeo Bank (Robichaud and Rose 2006). Nearshore areas, particularly those with marine vegetation (e.g., eelgrass), have been identified as important nursery habitats for juvenile cod (Gotceitas et al. 1997). Unlike northeastern Newfoundland bays where the planktonic cod stages are transported toward nearshore nursery habitats, few eggs or larvae are carried shoreward in Placentia Bay (Bradbury et al. 2000; Robichaud and Rose, 2006), suggesting nearshore areas, such as Blue Beach Cove, are under-utilized by juvenile cod.

Cod larvae and pelagic juveniles are primarily zooplankton feeders but once the switch is made to the demersal lifestyle, benthic and epibenthic invertebrates become the main diet. As the fish grow, the array of prey also widens. Prey often includes various crustaceans (crab, shrimp, euphausiids) and fish (capelin, sand lance, redfish, other cod, herring). The predators of young cod include older, larger cod, squid, and pollock, while larger cod are predominately eaten by marine mammals (Scott and Scott, 1988).

In the Great St. Lawrence Harbour area, Atlantic cod are commercially harvested south of the harbour at depths ranging from 27 to 90 m (DFO, 2009). The fishing season typically occurs from June to October with cod historically harvested using gillnets, cod traps, hook and line, and trawl (DFO 2009). Recreational fisheries for cod have also occurred over the past few years in Placentia Bay. This fishery is largely prosecuted using small open boats and gears typically consist of hook and line and rod and reel. Though variable and weather dependent, the recreational cod fishery is usually open for three weeks in August and one week in September or October. It is likely that the same cod grounds targeted for the commercial fishery are used by participants in the recreational fishery.

6.1.6.2 American plaice

American plaice is generally considered a coldwater species preferring water temperatures from 0 to 1.5ºC and a depth range of 90 to 250 m (Pitt 1982); however, it may occur in shallow waters <50 m or deep waters >700 m (Scott and Scott 1988). Adult movements of American plaice appears limited to offshore migrations into deeper water in winter and to shallower water in spring (Scott and Scott 1988). Spawning generally occurs in the spring during April for southern populations on the Grand Banks and Flemish Cap and during May or June for northern populations off Labrador (Pitt 1966). Prey items vary with size of individuals and locality but generally polychaetes, echinoderms, molluscs, crustaceans, and fish are consumed (Scott and Scott 1988).

In the St. Lawrence Harbour area, LEK indicates that “flounder” are fished commercially from May to October (DFO 2009). Though not specified, it is likely that “flounder” includes American plaice among other species. The flounder are targeted with nets and hook and line at depths ranging from 90 to 108 m. Flounder fishing grounds occur outside of St. Lawrence Harbour, typically from south of Lawn Point east to Ferryland Head.

6.1.6.3 Lumpfish

The lumpfish is a bottom fish of cold to temperate waters, living on rocky or stony bottoms. During early life it is frequently semi-pelagic often found hiding under floating seaweed. A pelvic adhesive disc allows adhesion to solid substrates, such as stones, lobster pots, and other objects (Scott and Scott 1988). During early summer, typically late April or early May, lumpfish migrate to shallow coastal waters to spawn and return to deep water in late summer and early fall where they remain from September until April (Collins 1976; Stevenson and Baird 1988). Off Newfoundland, spawning is believed to be temperature-dependent, generally occurring when the water temperature reaches 4ºC. Eggs are deposited as large spongy masses ranging in coloration from black to brown, red, pink, orange, yellow, green, to purple (Collins 1976). A wide variety of invertebrates are consumed as prey items and include euphausiid shrimp, pelagic amphipods, copepods, other small crustaceans, pieces of jellyfish, and comb jellies. Small fishes such as herring and sand lance are also consumed (Scott and Scott 1988).

In Newfoundland, the commercial lumpfish fishery targets spawning females for the roe market. Males and immature females are not desired and are discarded (Walsh et al. 2000). The fishery is conducted as an inshore fishery from small vessels from April until July (Blackwood 1983). Typically 20 to 100 large (20 to 25 cm) mesh nets are set in a series of long strings and left to fish two to three days or longer depending on the weather.

In the Great St. Lawrence Harbour area, lumpfish roe is largely harvested outside of the harbour though the distribution is indicated to extend around Cape Chateau Rouge. The species is harvested from May to June using lump nets set at depths ranging from 11 to 45 m (DFO 2009).

6.1.7 Macroinvertebrates

6.1.7.1 American Lobster

The American lobster is a benthic decapod crustacean that is distributed nearshore around the island of Newfoundland, including Placentia Bay (DFO 2006b). Lobster populations tend to be much localized in nature (DFO 2006b). The distribution of lobster in the Great St. Lawrence Harbour area extends from Blue Beach Point to Deadmans Cove (DFO 2009).

The major lobster life history events (i.e., molting, mating, spawning, larval hatching), described by DFO (2006b), typically occur between mid-summer and early fall. Mating occurs from July to September and the fertilized eggs are carried in clutches on the underside of the female’s tail for a period of 9 to 12 months. Hatching occurs over a four month period extending from late May through September. The larvae are planktonic for approximately six weeks and undergo three molts. After the third molt, the larvae resemble miniature adults and settle within suitable benthic habitat. Newly settled lobster progress through several juvenile stages and an adolescent phase before reaching adulthood. The diet of the adult lobster consists of crab, polychaetes, molluscs, echinoderms, and various finfish. Believed to have few natural predators, the majority of adult mortality is attributed to the commercial fishery.

The lobster fishery in Newfoundland is localized and prosecuted from small open boats during an 8 to 10 week spring fishing season (DFO 2006b). Traps are set close to shore generally at depths less than 20 m (DFO 2006b). Restrictive licensing and trap limits control fishing effort and stocks are currently assessed every three years. The last stock assessment occurred in 2006 (DFO 2006b). The Project Area occurs within Lobster Fishing Area (LFA) 10.

In the St. Lawrence area, the lobster fishery occurs from April to June with traps generally fished along the shoreline at depths ranging from roughly 4 to 36 m (DFO 2009). There are currently two active lobster licenses in the Great St. Lawrence Harbour area with one fisherman setting approximately 20 to 30 lobster pots in the vicinity of Blue Beach, most notably along the western corner of Blue Beach Cove (E. Jarvis, pers. comm. 2009).

6.1.7.2 Snow Crab

Snow crab is a decapod crustacean that occurs over a broad depth range (50 to 1,300 m) in the Northwest Atlantic. The distribution of this decapod in waters off Newfoundland and southern Labrador is widespread but the stock structure remains unclear. Snow crabs have a tendency to prefer water temperatures ranging between -1.0 and 4.0ºC. Large snow crabs (≥95-mm carapace width or CW) occur primarily on soft bottoms (mud or mud-sand) (DFO 2005), particularly in water depths of 200 to 500 m. Small snow crabs appear to be most common on relatively hard substrates (DFO 2005). Mating generally occurs during the early spring and the females subsequently carry the fertilized eggs for about two years. Large numbers of sexually paired snow crabs have been observed in relatively shallow water (10 to 40 m) during late April/early May in coastal Newfoundland (Taylor et al. 1985; Hooper 1986; Ennis et al. 1990). Snow crab larvae hatch in late spring or early summer remain in the water column for 12 to 15 weeks before settling on the bottom and maintaining a benthic existence (DFO 2005). Snow crab typically feed on fish, clams, polychaetes, brittle stars, shrimp and crustaceans, including smaller snow crab. Snow crabs are prey for groundfish, seals, and other snow crab (DFO 2003).

Crab harvesters use fleets of conical baited traps and the minimum legal size is 95 mm CW. The legal size excludes females and ensures a portion of the population of adult males will be available for reproduction (DFO 2005).

In the St. Lawrence Harbour area, snow crabs are generally harvested 2 to 3 miles, or approximately 3 to 5 km, outside the harbour (E. Jarvis, pers. comm. 2009). Crab pots are fished at depths ranging from 99 to 180 m from May to September (DFO 2009). Crab vessel traffic is relatively high in Great St. Lawrence Harbour, particularly the eastern side, because the area is home to the Supplementary Crab Fleet during the fishing season (E. Jarvis, pers. comm. 2009).

6.1.7.3 Squid

Two species of squid – the northern shortfin squid (Illex illecebrosus) and the longfin inshore squid (Loligo pealeii) – are distributed in Newfoundland waters. The northern shortfin squid occurs in the Northwest Atlantic from the Labrador Sea to the Florida Straits (Hendrickson and Holmes 2004) while the longfin inshore squid inhabits continental shelf and slope waters from Newfoundland to Cape Hatteras, North Carolina (Jacobson 2005). In general, both species are distributed in shallow inshore waters during summer and fall and in deeper waters during winter and spring (Hendrickson and Holmes 2004; Jacobson 2005). Spawning occurs while deep offshore areas are occupied. Adult squid predominately prey on crustaceans and small fishes. In turn, juvenile and adult squid are food for many pelagic and demersal fish species as well as marine mammals and seabirds (Hendrickson and Holmes 2004; Jacobson 2005).

Squid are harvested recreationally in the Great St. Lawrence Harbour area (DFO 2009; E. Jarvis, pers. comm. 2009). Typically caught on hook and line, squid are fished at depths ranging from roughly 4 to 18 m in August to September.

6.2 MARINE ASSOCIATED BIRDS

There are three Important Bird Areas (IBAs) located near the southern portion of the Burin Peninsula: Green Island (46.87° N 56.08° W), Middle Lawn Island (46.87° N 55.62° W), and Corbin Island (46.97° N 55.22° W).

Each of these islands is home to a significant number of breeding Leach's storm petrels. 50 breeding pairs of Black-legged kittiwake are found on Corbin Island (Bird Studies Canada, 2008) and Middle Lawn Island supports the only known active breeding colony of Manx Shearwater in North America. All IBAs are a sufficient distance from the proposed project location and no significant adverse impacts are anticipated due to project construction or operations. Grand Colombier Island (near St. Pierre and Miquelon) is also a significant breeding area for storm petrels.

During the surveys discussed in Section 5.2, twenty-four various species of shorebirds and seabirds were observed. These surveys included species such as Northern Fulmar, Northern Gannet, Manx Shearwater, Common Eider, White-Winged Scoter, Black Scoter, Long-Tailed Duck, Double-Crested and Great Cormorants, among others (Jacques Whitford, 2003).

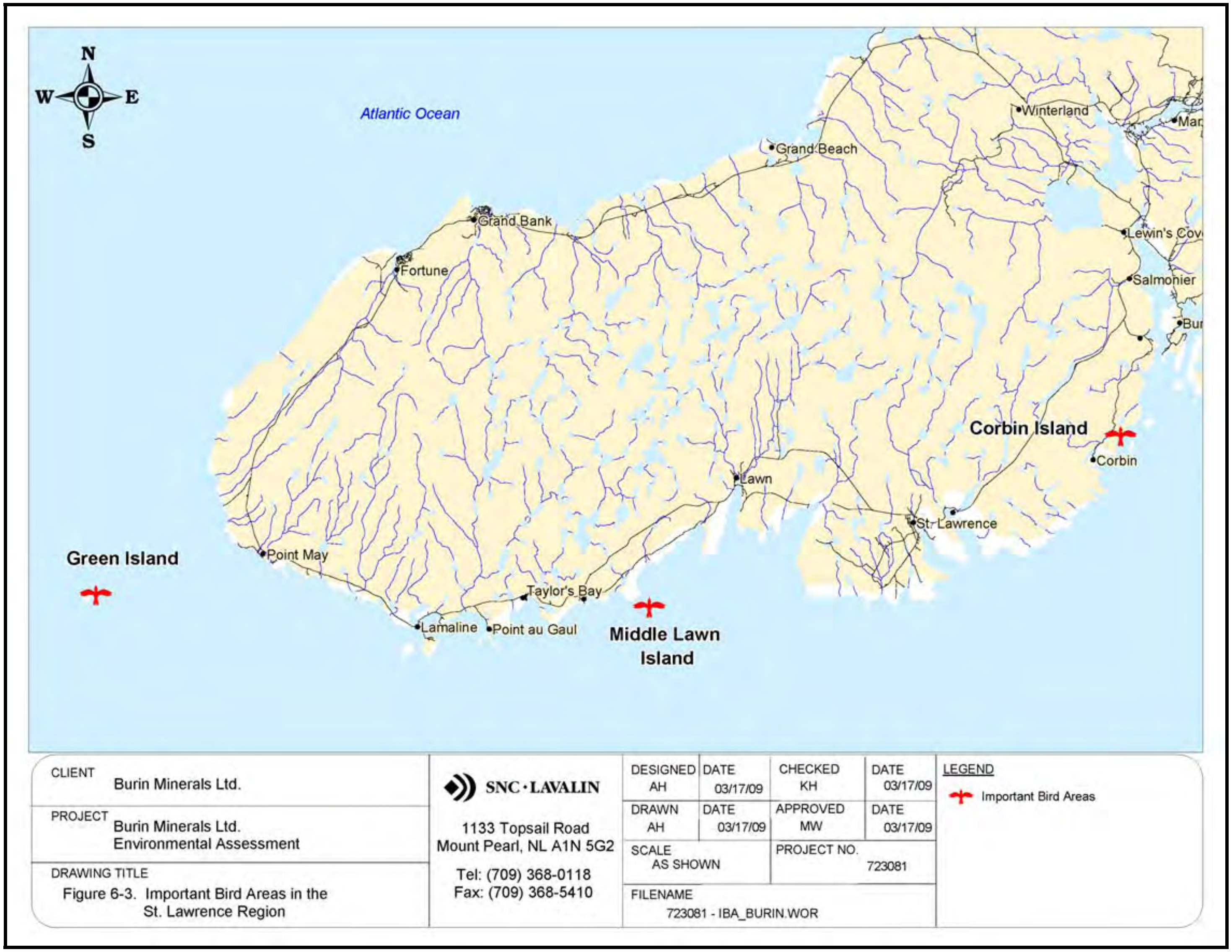


Figure 6-3: Important Bird Areas in the St. Lawrence Region

6.3 MARINE MAMMALS

Various mammals, including cetaceans and seals, are expected to occur within Placentia Bay – including this area. Based on the DFO marine mammal sightings database (as outlined in the Newfoundland and Labrador Refining Corporation Environmental Impact Statement in 2007), Humpback Whales, Minke Whales, and the Blue Whale (rarely) have been documented in the south-eastern Burin Peninsula area, as well as Atlantic White-Sided Dolphin, Harp Seals, Harbour Porpoise, and Long-Finned Pilot Whales. Fin Whales, White-Beaked Dolphins, Grey Seals and Harbour Seals are also commonly expected within Placentia Bay, but were not listed in the DFO marine mammal sightings database for the southern Burin Peninsula.

6.4 SPECIES AT RISK

As specified inn Section 1.22, protected species can be designated provincially under the *Endangered Species Act*, federally by the *Species at Risk Act*, or also by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) who operate independently of government.

Table 6.3: Protected Marine Species Possibly found in the Study Area

SPECIES		SCIENTIFIC NAME	SARA STATUS	PROVINCIAL ESA STATUS	COSEWIC STATUS
Marine Mammals & Sea Turtles	Blue Whale	*Balaenoptera musculus*	Endangered (Schedule 1)	-	Endangered
	North Atlantic Right Whale	*Eubalaena glacialis*	Endangered (Schedule 1)	-	Endangered
	Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered (Schedule 1)	-	Endangered
Fish	Atlantic Wolffish	*Anarhichas lupus*	Special Concern (Schedule 1)	-	Special Concern
	Northern Wolffish	*Anarhichas denticulatus*	Threatened (Schedule 1)	-	Threatened
	Spotted Wolffish	*Anarhichas minor*	Threatened (Schedule 1)	-	Threatened
Birds	Eskimo Curlew	*Numenius borealis*	Endangered (Schedule 1)	Endangered	Endangered

SPECIES		**SCIENTIFIC NAME**	**SARA STATUS**	**PROVINCIAL ESA STATUS**	**COSEWIC STATUS**
	Barrow's Goldeneye	*Bucephala islandica*	Special Concern (Schedule 1)	Vulnerable	Special Concern
	Harlequin Duck	*Histrionicus histrionicus*	Special Concern (Schedule 1)	Vulnerable	Special Concern
	Ivory Gull	*Pagophila eburnea*	Endangered (Schedule 1)	Vulnerable	Endangered

7 SOCIO-ECONOMIC ENVIRONMENT

7.1 DEMOGRAPHY

According to the 2006 Statistics Canada Census, 1,349 individuals were residents of St. Lawrence; a decrease of 13.4% from the 2001 census. The median age of community residents is 43.3 years (Stats Canada, 2008). See Figure 7-1 below for a graphic representation of population per 5-year age group.

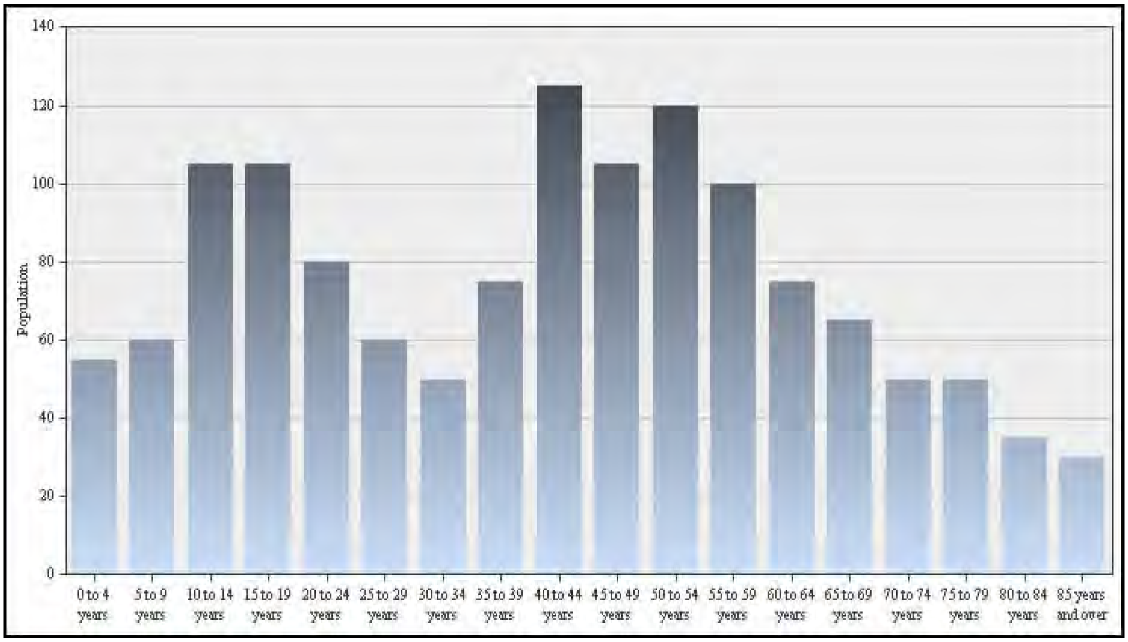


Figure 7-1: St. Lawrence, Newfoundland and Labrador Age Characteristics for Both Sexes – 2006 Data (Stats Canada, 2008)

7.2 ECONOMY AND EMPLOYMENT

Historically, the fluorspar mine and the fishing industry have been the most prevalent employers in the community of St. Lawrence. The fluorspar mines employed approximately 140 people in the late-1980s when Minworth PLC operated the mines (Discover St. Lawrence Community Website, 2008).

Currently, the main employers in the Town of St. Lawrence are the Grand Atlantic Seafoods fish processing plant, the local hospital (U.S. Memorial Health Care Centre), St. Lawrence Academy (Kindergarden-12), the local fishery, Farrell Brothers

Limited (local store), RGJ Construction, and Aylward's Home Hardware (Discover St. Lawrence Community Website, 2008).

Figure 7-2: St. Lawrence Harbour, NL. (Photo courtesy of N. Wilson)

Based on 2006 Census Data, 545 of the 1,060 people in St. Lawrence are considered to be in the labour force. 460 individuals of these 545 were employed at the time of the census. The top three employment industries in the community, according to 2006 census data, are listed as manufacturing, 'other services', and health care and social services (Stats Canada, 2008).

The 2005 (average) income for every man, woman, and child (personal income per capita) in St. Lawrence was $17,400. Half of the couple families in St. Lawrence had incomes of more than $45,200 in 2005 (Community Accounts, 2008).

7.3 TRANSPORTATION

Highway Route 210 provides a two-lane highway connection between St. Lawrence and the TransCanada Highway (Goobies). The Provincial Department of Transportation and Works maintain this highway. This department categorizes roadways within the Province based on their function, traffic flow, design features, and demands associated with land use/industries in the region.

Public roads within the Town of St. Lawrence are the responsibility of the municipality.

There are no taxi services within the Town of St. Lawrence, however several privately owned transportation companies provide service between the Burin

Peninsula region and St. John's. Companies include Foote's Taxi (daily service from Grand Bank) and R&E Taxi (daily service to St. John's for all communities between Point May to Marystown, including St. Lawrence).

Ferry service is also provided from the nearby community of Fortune and the French islands of St. Pierre and Miquelon.

7.4 TOURISM AND RECREATION

The Heritage Run Tourism Association is responsible for promotion of tourism attractions on the Burin Peninsula. The Heritage Run region is broken down into four specific 'Historic Drives'; with St. Lawrence falling within the Captain Clarke Historic Drive.

A number of attractions are located within St. Lawrence. In tribute to the bravery and care exhibited by residents of this community following the running aground of two American vessels in Chambers Cove in 1942 (the USS Truxtun and the USS Pollux), the "Echoes of Valour" Monument was erected in 1992. The St. Lawrence Miners' Museum documents the history of the fluorspar mine in St. Lawrence and is also a popular tourism attraction. Fluorspar crafted jewellery is also popular in the region (The Heritage Run, 2008).

Figure 7-3: Echoes of Valour Monument, St. Lawrence, NL. (Photo courtesy of D. Macdonald)

Recreation is a very important part of community life in St. Lawrence, especially notable for its excellence in the sport of soccer. Dubbed "The Soccer Capital of Canada", a number of facilities and programs have been available for many years within the community. Hikes to Blue Beach, Cape Chapeau Rouge, Calapouse Head, and Red Head are also frequented by locals and tourists, as are visits to the Middle Point Lighthouse. St. Lawrence also boasts an indoor curling rink, outdoor basketball and tennis courts, as well as organized school sport programs (Discover St. Lawrence Community Website, 2008). Members of the community also regularly organize activities, such as bingo.

Figure 7-4: St. Lawrence, NL: "The Soccer Capital of Canada"

7.5 FEDERAL INFRASTRUCTURE, PROVINCIAL AND MUNICIPAL SERVICES

St. Lawrence has a federally owned and maintained government wharf on the west side of the harbour. A Harbour Authority is designated to over-see use of the government wharf.

The Province of NL provides a medical care facility in St. Lawrence (U.S. Memorial Health Care Centre), as well as an all-grade school (St. Lawrence Academy).

Figure 7-5: St. Lawrence Harbour (Photo courtesy of N. Wilson)

The Town of St. Lawrence maintains a network of paved streets and provides water and sewer services. Street lighting, snow clearing, garbage collection and general maintenance of infrastructure is provided by the Town. Recreational facilities (such as soccer fields, outdoor basketball courts, and the recreational centre) are also maintained by the municipality.

8 LAND AND WATER USE

8.1 ZONING DESIGNATIONS

The land-based portion of the Project is encompassed within the "Mineral Workings" designated area of the Town of St. Lawrence Municipal Plan.

In 2002, the Town of St. Lawrence adopted Municipal Plan amendments (Numbers 1 and 2) in the Blue Beach and Blue Beach Point areas. Amendments included:

- The rezoning a portion of land west of Blue Beach Point from "Conservation" to "Mineral Workings";
- Rewording of the Mineral Working Policy designation to include "general industry and transportation", which allows for "the development of the Blue Beach area as a future major deep water port".

As required by the Provincial Government's *Urban and Rural Planning Act*, opportunities for public consultations were provided to the public. Notices were placed in The Southern Gazette (January 7 and January 14, 2003) clearly stating that the purpose of the amendments was to "allow the development of the Blue Beach Area as a future major deep water port by allowing transportation uses in the minerals working designation and by redesigning a portion of the conservation area west of Blue Beach Point to Minerals Working."

8.2 CURRENT LAND OWNERSHIP

Burin Minerals Ltd. acquired the assets of the former Minworth operations from the government of Newfoundland and Labrador in 1994/95. As a result, Burin Minerals Ltd. is the current owner/operator of the parcel of land designated as 'Minerals Workings' by the Town of St. Lawrence (approximately 30 km^2).

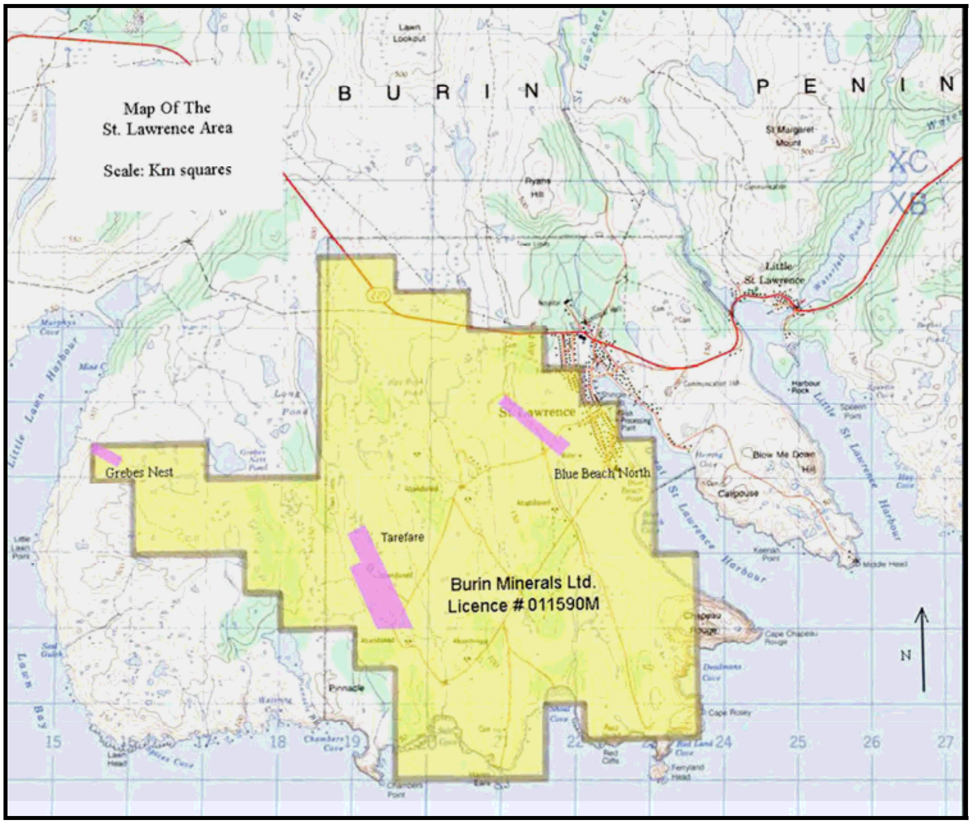


Figure 8-1: Current Burin Minerals Ltd. Mineral Rights

BML holds mineral rights to the Tarefare, Blue Beach and Grebe's Nest Vein structures through mining leases. In addition, BML holds 118 mineral claims under license 011590M covering an area of 2950 hectares. In 1997, the company was granted Surface Rights through a 50-year Lease (original license E-110124) to the Blue Beach North Mine portal area (23.304 hectares) adjacent to Director Road and to the Process Mill Site (20.0074 hectares) adjacent to Clarke's Pond as part of the Call for Proposal Agreement 1994. BML also was granted (in 1996) a 25-year Permit to Occupy (E-110278) the Shoal Cove Pond area for use as a tailings management facility. This permit does not take precedent over the fact that further environmental assessment is required prior to occupying the site.

There are no designated Aboriginal lands in the St. Lawrence region. Project activities will not impact Aboriginal or First Nations groups within the province.

8.3 CURRENT LAND USE

The Project area is currently unoccupied, with the exception of BML offices located near the mill facility and two homes located off the Blue Beach South road between Clarke's Pond and Blue Beach. These homes are on privately owned property and draw their water from the municipal system. Four other homes are occupied off Director Drive (leading from St. Lawrence to the old Alcan Director minesite) in the vicinity of Haypook Brook/Canal and located about 2 km from the existing millsite to the southeast, 3 km from Tarefare No. 2 shaft to the southwest, and 1 km from the Blue Beach North minesite to the east.

In 2002, the Town of St. Lawrence amended its Municipal Plan (Amendment Nos. 1 and 2) to support the construct of a deep-water marine terminal in the Blue Beach and Blue Beach Point areas. Amendments included:

- Rezoning, from “Conservation” to “Mineral Workings”, a portion of land west of Blue Beach Point (as shown on maps provided in Appendix A);
- Re-defining the “Mineral Workings” land use designation to include “general industry and transportation”. This allows for development of docks and wharfs (including deep-water marine terminals) within this zone.

As required by the Government of Newfoundland and Labrador's Urban and Rural Planning Act 2000, a prescribed public consultation process was followed in making these amendments. A public hearing was scheduled and notices were placed in the local newspaper (The Southern Gazette - January 7th and 14th, 2003 editions).

Part IX (Transportation), Paragraph 28(c) of the *Comprehensive Study List Regulations* states that “…a marine terminal designed to handle vessels larger than 25,000 DWT” would require a comprehensive study level Environmental Assessment “…unless the terminal is located on lands… that are designated for such use in a land-use plan that has been the subject of public consultation”. Provided that both of these requirements have been met (as Burin Minerals Ltd. has discussed with various Federal Government agencies), the marine terminal proposed as a component of this project is therefore exempt from this provision.

The “Mineral working” zone allows for “mining, quarrying and associated processing and manufacturing, general industry and transportation are permitted within areas designated for this purpose…”.

As described above, the area of coastline extending east from Blue Beach Point into Great St. Lawrence Harbour has been zoned “Conservation Urban” (V) by the Town of St. Lawrence. Activities associated with the construction or operation phase of the Project are not anticipated to have an impact on this zone or the residents living in this area.

The land within the area zoned as Minerals Rights by the Town of St. Lawrence is not currently being used for industrial purposes. A drilling program was undertaken by Burin Minerals Ltd. in the fall of 2008 throughout the area, however mining/milling has not occurred on site since 1990.

Some local residents utilize the unpaved access roads (ATV users, walkers) and berry pickers occasionally use the area. This is expanded upon in Sections 3.5.3 and 3.6.5: Potential Causes of Resource Conflicts.

The shore of Blue Beach is currently not being utilized. There is no infrastructure in place along this portion of coastline. Shoal Cove, just west of Blue Beach, is known for its sandy beach and is often used by recreational users.

There are no National Parks or National Historic Sites located near the project area. There are also no designated aboriginal lands near the project area.

The wreck sites of the USS Truxtun and USS Pollux (located in Chambers Cove and off Lawn Head, respectively) have been designated as municipal historic sites by the Heritage Foundation of Newfoundland (a non-profit organization). The Iron Springs Mine site (located about 3 km from the existing mill/office site) is also classified as a municipal heritage site.

There is a Provincial park located in Frenchman’s Cove and privately owned park facilities in Lewin’s Cove (which is approximately 28 kms from the project area). The Fortune Head Ecological Reserve is located in Fortune, approximately 70 km away.

Figure 8-2: Chambers Cove: Wreckage site of the USS Truxtun and the USS Pollux (Photo courtesy of N. Wilson)

8.4 HISTORICAL LAND USE

As discussed in Section 3.2, the area in which construction and operations would take place is considered a brownfield site due to several decades of mining/milling, beginning in the 1930s.

An archaeologist registered with the Provincial Archaeology Office (PAO) of Newfoundland and Labrador undertook a preliminary desktop historic resources review for Burin Minerals Ltd in February 2009.

The Provincial Archaeology Office registered Blue Beach as an archaeological site in 2007 as a result of wreckage observed on the beach. However the conclusions of the preliminary desktop historic resources study (completed by Gerald Penney Associates Limited) indicated that the project area does not "present high expectations for either a pre-contact or early historic archaeological site" (Burin Minerals Limited - Historic Resources Desk-Based Assessment, 2009). Further historic resources survey work is planned for May 2009.

9 PUBLIC CONSULTATIONS

9.1 PUBLIC CONSULTATIONS

Burin Minerals Ltd. recognizes the importance of public consultations throughout the entire environmental assessment process. Various methods of public participation will be implemented to ensure open lines of communication are maintained. Significant effort has been made at this point to provide stakeholders with information regarding the project and opportunities to seek answers to any project-related questions. Additional information regarding initial Issues Scoping is provided in Section 9.2.

Table 9.1: Summary of Burin Minerals Ltd. Consultation Meetings Held to Date

GROUP	DATE	KEY POINTS AND ISSUES
Canadian Environmental Assessment Agency (CEAA)	November 20, 2008	Project will be subject to both levels of environmental assessment.
Major Projects Management Office (MPMO)	November 20, 2008	Unsure if MPMO will be involved in this project (later determined in February 2009 that this project does not meet the criteria for MPMO involvement).
NL Dept. of Environment and Conservation, Environmental Assessment Division	November 20, 2008	Proper consideration to alternatives should be provided.
Transport Canada	January 7, 2009	TC will likely be involved in EA (Navigable Waters Protection Act may be triggered).
Fisheries and Oceans Canada	January 7, 2009	HADD will apply to freshwater and marine fish habitat lost due to project. The existing freshwater HADD compensation agreement is still in effect, providing that no significant changes have occurred to the Project since the agreement was signed. Discussion of freshwater/marine fish habitat within the project footprint. Surveys for marine habitat will be initiated during spring 2009.
Environment Canada &	January 7, 2009	No known species at risk found within project

GROUP	DATE	KEY POINTS AND ISSUES
Canadian Wildlife Services		site. EC confirmed that Metal Mining Effluent Regulations (MMER) are not applicable to this Project.
NL Dept. of Environment and Conservation, Environmental Assessment Division	January 6, 2009	Discussed reasoning associated with need for new deep-water port (safety concerns at previous used wharf, need deeper water). Schedules and expected timeline for registration.
NL Dept. of Environment and Conservation, Pollution Prevention Division	January 6, 2009	Discussion of proposed plans for processing and tailings management area.
NL Dept. of Environment and Conservation, Water Resources Management Division	January 6, 2009	Discussed possible sources of water for processing and clarified that no surface draining will be required.
Canadian Environmental Assessment Agency (CEAA)	January 15, 2009	Discussion of municipal amendments made by the Town of St. Lawrence and how this relates to the Federal EA process.
Fish, Food and Allied workers	January 21, 2009	Number of shipments annually and size of vessels that can be expected. Discussion of where/what effluent would be released into the marine environment (no marine intake). Discussed possible use of Blue Beach area by local fish harvesters.
St. Lawrence Town Council	February 23, 2009	Provided summary of proposed project, discussion of previous efforts to reactive mine (in mid-1990s). Discussion of project schedule and past use of Shoal Cove Pond by previous mine operators. BML reassured town council that many measures would be taken to improve working conditions for mine/mill employees. Town Council of St. Lawrence expressed their support for the proposed project.
Town of St. Lawrence –	February 23, 2009	Questions asked:

GROUP	DATE	KEY POINTS AND ISSUES
Open House		Inquiry regarding process by which the community can register public comments. Questioned the degree to which the water level in the Shoal Cove Pond will rise (impact on the road to Red Head). Detail requested regarding the response from potential fluorspar customers. Inquired about the involvement of the Provincial Department of Environment and Conservation. Questioned whether the company would ensure health/safety protection of workers (referencing past health issues). Inquiry regarding potential role for a union at the mine/mill. Further explanation of fish habitat compensation was requested. Inquiries regarding planned water supply for processing (Clarke's Pond?).
Schooner Regional Development Association	February 24, 2009	Proposed timeline was discussed. Schooner Inquired about BML's need for supporting infrastructure, labour analysis studies, etc.
NL Department of Natural Resources	March 18, 2009	Inquired about previously completed fish habitat work. Mine Plan progress and Project timelines were discussed. Alternatives should be given proper consideration, with focus on TMF.
Fisheries and Oceans Canada	March 19, 2009	Discussion of marine fish habitat within the project footprint. Agreed that surveys for marine habitat will soon be initiated.
Fisheries and Oceans Canada	March 27, 2009	Discussion of freshwater fish habitat within the project footprint and proposed plans for the tailings management facility. Reviewed previously approved HADD agreement.

Contact has also been made with the Burin Peninsula Environmental Reform Committee and the Provincial Archaeology Office. Burin Minerals Ltd. representatives also hope to consult with the Provincial Departments of Health and Community Services and Human Resources, Labour and Employment in the near future.

Initial discussions have not yet been held with all pertinent agencies and groups. The planned public consultation process will continue throughout the environmental assessment process.

9.2 PREMLIMINARY ISSUES SCOPING

9.2.1 Project Feedback

Table 9.1 (in Section 9.1 above) identifies key points and concerns brought to the attention of Burin Minerals Ltd. during consultation meetings held to date. Meetings have been held with government departments, communities, and various other stakeholder groups. Following consultations will all relevant stakeholders, this issues list will be updated.

- Residents of St. Lawrence are generally positive about the potential economic benefits of this project. Local businesses are also interested in potential spin-off opportunities.
- During meetings and public consultations, questions were raised regarding historical health impacts associated with working in the St. Lawrence mine. Burin Minerals Ltd. has reassured the public that all necessary mitigation measures will be taken (see Section 3.2.5.2) and proper protective measures implemented. Worker health and safety will be of utmost priority. Burin Minerals Ltd. has also indicated that many of the past health problems associated with the mine were significantly improved upon by the most recent mine operators (in the 1960s and 1970s).
- No major concerns have been identified with respect to project-related shipping. Given the proximity of St. Lawrence (on the southern tip of the Burin Peninsula) to international shipping routes and the small number of

shipments required per year (18-20), very little interaction with other marine-users in anticipated.

- Through preliminary discussions with the FFAW, an inquiry was made with respect to the constituents of water leaving the polishing pond in the tailings management facility. Burin Minerals Ltd. reassured that all water entering Shoal Cove would be frequently monitored to meet necessary guidelines and regulations. Water quality monitoring/treatment stations and spillways will be included in the final design.
- Through discussions with groups such as the Schooner Regional Economic Development Board and the Town of St. Lawrence, a need has been expressed for a labour market analysis of the Burin Peninsula Region. This study would allow identification of occupations in which there is a deficiency of workers. Burin Minerals Ltd. has committed to maximizing local benefits through the process of hiring employees from the project area. A labour market analysis would also allow the Collage of the North Atlantic (Burin campus) to assist in responding to gaps in required occupations.
- Some questions have been raised regarding the impact of water level increases in Shoal Cove Pond on a nearby unpaved road. This road is used by some community residents for recreational purposes, such as walking (See Section 9.2.2 below). Burin Minerals Ltd. has reassured the public and the Town Council of St. Lawrence that the company will ensure the road is rerouted slightly further upland to ensure the use of the road is not impeded.

9.2.2 Water Valuation – Shoal Cove Pond

Following requests from the Water Resources Division of NL DOEC, Burin Minerals Ltd. made efforts to determine the social value placed on Shoal Cove Pond by community residents. Engaging the public is very important in this process and provides many benefits throughout decision-making processes, as is identified in the Canadian Council of Minister's of the Environment Report entitled "Analysis of Economic Instruments for Water Conservation" (2005).

In order to obtain a preliminary gauge on the level of value placed on Shoal Cove Pond, Open House attendees were asked to rate the degree to which they value the Shoal Cove Pond area and how frequently they use the area.

Attendees were asked to rate their value of Shoal Cove Pond where:

- 1 = “I place very little value on Shoal Cove Pond and rarely use the area around the Pond”;
- 5 = “I place a high level of value on Shoal Cove Pond and use the area around the pond frequently”.

Of the 155 exit surveys completed, 123 attendees rated their value of Shoal Cove Pond between 1-3, with an average rating of slightly over 2. Only 13 people reported that they placed a high level of value on Shoal Cove Pond and used the area frequently.

When asked to identify the types of activities (if any) in the Shoal Cove Pond area, the most common response (with 36 votes) was Walking / Running / Hiking / Cross-Country Skiing. 101 people did not respond to this question.

These responses support the general attitude expressed throughout that the community (also expressed by the Town’s mayor at the February 23rd meeting with council) that this area has been used by the mining industry for many decades, and is therefore considered a brownfield industrial area and is not frequently used by most community residents.

9.3 OPEN HOUSE – ST. LAWRENCE

9.3.1 Summary of Open House

An Open House was held in St. Lawrence on February 23, 2009 at the Community Rec. Centre. Significant effort was made to advertise for this open house and, as a result, approximately 140 people attended the event.

Advertising for this event included:

- Advertisement in the Southern Gazette newspaper for the two weeks leading up to Open House (February 17th and February 24th, 2009);
- Flyers sent to every mailbox in the community of St. Lawrence;
- Advertisement placed on the local community channel;
- Advertisements on local radio station (CHCM);
- E-mails invitations to representatives of specific stakeholder groups (including Provincial and Federal government agencies);
- Posters placed around the community of St. Lawrence (post office, town hall, stores, etc); and
- Faxes sent to St. Lawrence Academy and College of the North Atlantic (Burin Campus), inviting students to attend.

Advertisements specified the time, date and location of the Open House and provided details on the types of information that would be available at the meeting.

Exit surveys completed by Open House attendees indicated that the majority of people were made aware of the meeting via a poster in the community, radio ad, flyer received by mail, or the newspaper ad.

Several large posters (2' X 3') were available for review and discussion at the Open House. Posters provided information regarding environmental assessment timelines, the proposed marine terminal location, company health and safety commitments, and types of occupations required during construction and operations, for example. Copies of these posters were also made available for all meeting attendees.

Time was permitted for 'mingling' and viewing of the posters/handouts prior to a slide presentation, which was given by BML and their EA consultant.

Sufficient time was provided following the presentation for all questions from the audience. Section 9.2 below outlines all questions asked during the Open House and the results of the exit survey.

9.3.2 Results of Open House

Questions asked during the Open House by meeting attendees covered the following topics:

- How the public would be able to provide public feedback on EA documents;
- Changes to water level in Shoal Cove Pond;
- Response from fluorspar buyers;
- BML's level of contact with DOEC and other government agencies;
- Health and safety of employees;
- BML's position regarding unions on-site;
- Explanation of fish habitat compensation;
- Water supply for mill processing (Clarke's Pond?).

As part of the Open House exit survey, participants were asked to identify their top 3 concerns related to the proposed mine reactivation from a list of provided options. These choices included:

- Local Employment
- Open Consultations
- Maximize Local Benefits
- Project-Related Shipping
- Tailings Management
- Impacts on Fish Habitat
- Work Force Availability
- Waste Management
- Air Emissions/Noise
- Health and Safety Plan
- Other

Following tabulation of exit survey results, *Local Employment; Health and Safety Plan;* and *Work Force Availability* received significantly more votes than other categories (see Table 9.2).

Table 9.2: Results of Open House Exit Survey - Identified Concerns

Issue	# of Responses
Local Employment	**121**
Health and Safety Plan	**116**
Work Force Availability	**68**
Maximize Local Benefits	34
Tailings Management	32
Air Emissions/Noise	24
Waste Management	21
Open Consultations	11
Impacts on Fish Habitat	11
Project-related Shipping	10
Other:	Union – 1 Milling - 1

10 FUNDING

The founders of Burin Fluorspar, parent company of Burin Minerals Ltd, will fund their fluorspar project through private financing. The company's founders have a long history of raising and funding successful projects in the resource field. The company will be publicly traded and will access its major funding through available private and public equity investments and bank and private debt.

Burin Minerals Limited currently has no plans to request Federal funding to support development of this project. Financial assistance has been requested from the Government of Newfoundland and Labrador in support of the deep-water port however no announcements have been made by the province at this point in time.

11 PROJECT RELATED DOCUMENTS

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Authorization for Works or Undertakings Affecting Fish Habitat. Fisheries and Oceans Canada. March 1997.

CEAA Screening Report: Shoal Cove Pond Tailings Project. Department of Fisheries and Oceans. February 1997.

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Personal Communication

E. Jarvis — Local fisherman; Head of St. Lawrence Area Fisherman's Committee

APPENDIX A:

A1 - Potentially Applicable Provincial and Municipal Authorizations

A2 - Potentially Applicable Federal Authorizations

A1 - Potentially Applicable Provincial and Municipal Authorizations

Government Agency	Permit, Authorization, Approval	Activity Requiring Compliance
Department of Environment and Conservation		
Environmental Assessment Division	Release from Environmental Assessment	General
Pollution Prevention Division	Certificate of Approval to Operate a Refinery	General
Water Resources Division	Alteration to a Body of Water (Schedule A to H). This application form is required as well as the appropriate Schedule application form (see below).	Any activity in or near any body of water Permit required for any infilling of any water bodies including marine infilling.
Water Resources Division	Schedule A - Environmental Approval of Culverts	New road construction
Water Resources Division	Schedule B - Environmental Approval of Bridges	New road construction
Water Resources Division	Schedule C - Environmental Approval of Dams	
Water Resources Division	Schedule D - Environmental Approval of Fording	
Water Resources Division	Schedule E - Environmental Approval of Pipe Crossing – Water Intake	
Water Resources Division	Schedule F - Environmental Approval of Stream Modification or Diversion	New road construction
Water Resources Division	Schedule G - Environmental Approval of Small Bridges	New road construction
Water Resources Division	Schedule H - Environmental Approval of Other Alterations	Other works within 15 meters of a Body of Water.
Water Resources Division	Certificate of Approval for Site Drainage	Water run-off from the project site.
Water Resources Division	Water Use Authorization	
Water Resources Division	Certificate of Approval – Water & Sewer Distribution System	
Water Resources Division	Certificate of Approval for Temporary AGM (ARD) Storage	
Pollution Prevention Division	Certificate of Approval for Industrial Facilities or Processing Work	A certificate of Approval may be required for any industrial or processing works.
Pollution Prevention Division	Certificate of Approval – Waste Disposal Facility	
	Environmental Protection Plan (EPP) – Construction	General
	Emergency Response Plan	General
	Environmental Effects Monitoring Plan	Also has to be submitted to Department of Fisheries and Oceans.

Government Agency	Permit, Authorization, Approval	Activity Requiring Compliance
Department of Natural Resources		
Forestry Resources Branch	Commercial Cutting/ Operating Permit	
Forestry Resources Branch	Burning Permit	
Mines and Energy Branch	Magazine Licence	
Mines and Energy Branch	Explosives Transportation Permit	
Mines and Energy Branch	Application for Exploration Approval and Notice of Planned Mineral Exploration Work	
Mines and Energy Branch	Quarry Permit	
Mines and Energy Branch	Reclamation Plan (Including Financial Assurance)	
Department of Government Services		
Government Services	Licence to Occupy Crown Land	
Government Services	Certificate of Approval – Sewage Treatment Plant	
Government Services	Certificate of Approval – Storage and Handling of Gasoline and associated products.	
Government Services	Permit for Flammable and Combustible Liquid Storing and Dispensing (Above or Below Ground) and for Bulk Storage (above ground only)	
Government Services	Storage Tank System Application	All Storage Tanks on Site Including Waste Oil Tanks.
Government Services	Compliance Standards – National Fire Code, National Building Code and Life Safety Code	All Buildings on Site.
Government Services	Building Accessibility Exemption	All Building on Site
Government Services	Statutory Declaration for Registration of Boiler and Pressure Vessel Fittings Fabricated in Newfoundland and Labrador	
Government Services	Certificate of Plant Registration for Power, Heat, Refrigeration, Compressed Gas or Combined Plant	
Government Services	Contractor's Licence – Pressure Piping System	
Government Services	Examination and Certification of Welders and Blazers	
Government Services	Examination and Certification of Propane System Installers	
Government Services	Food Establishment Licence	If a cafeteria is located on site.
Government Services	Waste Management Plan	General

Government Agency	Permit, Authorization, Approval	Activity Requiring Compliance
Department of Transportation and Works		
Transportation and Works	Compliance Standard – Storing, handling and transporting dangerous goods	General
Department of Human Resources Labour and Employment		
Human Resources Labour and Employment	Compliance Standard – Occupational Health and Safety	Project-related employment
Department of Tourism, Culture and Recreation		
Tourism, Culture and Recreation	Compliance Standard – Historic Resources Act	Construction and operation.
Tourism, Culture and Recreation	Archaeological Investigation Permit	
Department of Human Resources, Labour and Employment		
Human Resources, Labour and Employment	Occupational Health and Safety Manual	General
Town of St. Lawrence		
Town of St. Lawrence	Compliance Standard/ Development Plan	Project Construction and Operation

A2 - Potentially Applicable Federal Authorizations

Government Agency	Permit, Authorization, Approval	Activity Requiring Compliance
Transport Canada		
Transport Canada	Permit to Store, Handle and Transport Dangerous Goods	
Transport Canada	Navigable Waters Protection Act (NWPA)	Wharf Construction or any activity affecting navigable waters.
Transport Canada	Letter of Assessment for Stream Crossings (NWPA)	Stream crossings.
Department of Fisheries and Oceans		
Marine Environment and Habitat Management Division	Authorization for Harmful Alteration, Disruption of Destruction (HADD) of Fish Habitat	Marine - Wharf construction and marine infilling. Freshwater - any pond/stream work that will impact fish habitat.
Marine Environment and Habitat Management Division	Letter of Advice	
Marine Environment and Habitat Management Division	Project Referral	
DFO	Environmental Effects Monitoring Plan	Also has to be submitted to Department of Environment and Conservation.
Environment Canada		
Environment Canada	Compliance Standard – Fisheries Act, Section 36(3), Deleterious Substances	Any project-related water run-off
Environment Canada	Scientific Research Permit (Wildlife Permit)	
Canadian Wildlife Service	Compliance Standard, Migratory Birds Convention Act and Regulations	Any activities that could result in the mortality of migratory birds and endangered species and any species under federal authority.
Industry Canada		
Industry Canada	Communications Licence	General
Industry Canada	Radio Station Licence	Use of radios on site
Canadian Nuclear Safety Commission		
Canadian Nuclear Safety Commission	Nuclear Substances and Radiation Devices	General